# HELMINTH PARASITES (DIGENIA. TREMATODA) OF FRESH WATER FISHES OF DISTRICT KANPUR

By

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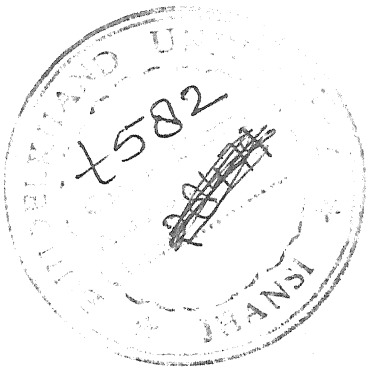


**DEPARTMENT OF ZOOLOGY**

**BIPIN BIHARI (P. G.) COLLEGE**

**JHANSI 284 001**

**INDIA**

DEDICATED

TO MY DEAR

FATHER-IN-LAW

AND

MOTHER-IN-LAW

DEPARTMENT OF ZOOLOGY
BIPIN BIHARI (P.G.) COLLEGE
JHANSI-284001

Dr. S.C. Agrawal
M.Sc.,Ph.D.

Dated: Dec. 12, 1993

## CERTIFICATE

Certified that the thesis entitled, "HELMINTH PARASITES (DIGENIA, TREMATODA) OF FRESH WATER FISHES OF DISTRICT KANPUR" submitted by Smt. Geeta Sachan, M.Sc. for the award of degree of Doctor of Philosophy in Zoology of the Bundelkhand University embodies the original piece of work done by her. She has worked under my guidance and supervision for more than twenty four months, commencing from the date of his registration.

It is further certified that the candidate has put in an attendance of over 240 days in the Department from the date of her registration for Ph.D. degree of the University as required under relevant ordinance.

S.C. Agrawal

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(GEETA SACHAN)

# C O N T E N T S

Introduction ( Entitled)

" HELMINTH PARASITES ( DIGENIA, TREMATODA) OF FRESH WATER FISHES OF DISTRICT KANPUR"

The Fish constitude on economically important group of vertebrates these constitude an important source of nutritive food for man from time immemorial. These have ,influenced human life on various ways. This has developed into a flu-rishing fish industry and a means of earning foreign exchan--ge by exporting fish and fish products. Fish provides seve--ral by products to serving as an important item of food and are eaten either cooked or row. Uncooked fish deterionate rapidlly after being caught and must be consumed soon or be prescribed for later use. Fish industries have developed for preserving, icing and canning of fish. The fish are preserved for exporting by smoking; Salting and freezing in ice. These are consumed in almost all the countrys of the world. Fish are being used as food from the time of palaeolethic man. Fish diet provides- proteins, Fat, Vitamins, etc. Fish meals contains 13.30% protein and provides 300-1600 caloriesenergy per gram. Moreover fishes are a good source of the food as phosphorous and oils(Body oil and liver oil) proteins and

other inorganic element. The fishes have good ~~and~~ taste and easily digestable. Therefore, a large number of fresh water brankish and marine fishes are regularly captured in various parts of the world by using various methods such as - spears, Baited, hooks, traps and nets etc. Fish caught per year all over the world is above 350 Millions tons and provides two millions of people and only in India all over : 15000.000 tones of fish is caught yearly. Fish is a very popular food in world. In India mostly south India, Madras, Andhrapradesh, Calcutta fish eaten in a large amount. The fish is not only edible material It's different part of fish body are used in various Industries in India. Fish liver oil industries was set up In Madras and Travancore during world war. Second impo-rtant of cod liver oil. It produced in Kerela, Karnataka and Tamilnadu. It's marketed by Government oil factories. It has been estimated that India produce about 300 quintals of fish oil annualy.

Fish manure is prepared from fishes which are not relished by man. When these are caught proportion more than can do consumed or if these are landed in spoiled condition such fish are sun dried and than grand. It is fish manure and provides nitrogen, calcium and phosphorous. Fish oil is pre-pared by boiling the fishes in water, and prepared oil is

washed in boiling salt water. Fish oil generally used in painting like lubricant, cosmetics, manufacture of candles cutuing oild varnishing, soap, in leather and ste--el industires, pharmaceuticals linalium rubber substitutes water proof. Compositions. Printing ink core oil etc. and fish liver oil obtained vitamin A and D.The liver oil is prepared from the shark and Rays, cods, haliputsa and tunas Liver oil contained 55-75% Fat,510% protein, and bitanmin a & D. It considered to great medicinal value. This oil is also use in poltry forming.

Fish is use in a farm of meal and cake the scrap from cannaries and small fishes not realised as food by manuare dried and ground into fish meal. It is use in poultry pigs, and cattles etc. The fish are cooked in large pots containing water and washed then remove the water and dried in sun heat. This dried sterilized products use long time .It is known as fish cake. It fish meals is rich in proteins,phosphorous, calcium etc.

Fish protein is prepared by removing the fat from fish flour with dilute castic soda solution, neutralised dried and obt--ained as white powder without any fishy smell.It contains eighty to ninty percent soluble protein. It is used in the

preparion of icecream, pharmacticals, paints, varnish , textiles paper and cosmetics also increasing the proteins contain of bread and cake.

Fish flour this is actually fish manure but It is comparati--vely fine and of better quality. It is highly nutritetive food for human beings . It prepared commercially by soloent extraxtion process. It is easily digested by the infants of 3-4 months. It is eated in farm of biscuits , bread, cakes, sweets and soaps by mixing with wheat or Maize flour is also treated to remove bed smell.

Liquid glue is prepared from the connective tissue of fish skin fins and bones. The glue is used in Adhesive in book binding , sticking , lebels , wood, leather , and glass and manufactured by furniture. Isinglass is high grade colleag--en produced from the air bladder or swim bladder of certain fishes. viz cat fishes and carps. The air bladder and swim bladder is firstly washed to remove the blood and other extramatter and then outer layer is scrapped off. The scrapped bladder is airdried and used for the preparition of purse honey comb, book and ribbon binding it is form of a shining white powder , used for clearing wine beet and making edible jelley.

Fish leather - Some fishes likes sharks and rays skin leather is used for covering m cord cases, Jewlboxes., scabbards and for several other ornamental purposes. After special tanning is that after removed of dermal denticles strong and highly durable leather are prepared manufacturing of parses, begs ladies shoes, boxes and suitcases etc. Because of the presence of placoid scales the skin, of shark and ray is rough but look more beautifull. It is use during war are prepared from skin of globefish. The skin of cod, salmon Hali but and other large fishes are also tanned and convented into leather.

Shagreen - The rough skin of sharks used in rubbing and poli--shing the furniture and is called shagreen. Fish fins-of shark are exported to china. Where these are greatly appreci--ted for preparing soap. Fish used in pearls. the material obtained by scropping in silvery coating of the scales of certain fishes is called quanine. It is used in polishing the Hollow glass, beads these beads are then filled with wax and marketed as artificial pearls used in jewellery. For sports and games - fishing froms an important out door

game for millions of people. Various species of trout, salmon, carps and other species of fishes are used in games Fishes use in decoration several species of beautifully coloured fishes are kept in aquaria, ponds and lakes and used for ornamentation Biological control several species of fishes lavoivorous in habit and feed upon insect larvae' eg-chela, puntius, Berilius, Banio, colisa, Rasbora, E-somas, Ambassis, Aplocheilus etc. several diseases are spread by mosquitoes hence the larvivorous fishes are intorduced in the water of the area. They feed upon larvae and help in reducing the population of mosquitoes. Evolutionary significance the choa--nichthyes or crossopterygian fishes are very important as these provide evidence for the evolution of tetrapods, The land vertebrates and the lung fishes are spoken of as "the uncles of land dwellers" These are first amphibians have acommon grand father having arisen from some primitives ance--stral fish stock.

Certain fishes are harmful to man. Because Host of certain parasites act as a intermediate host of many human parasites which help in the dispersal of many human and cattles diseases.

Fishes provide good opportunity far millions of people for the living and jobs orientation. The fish is no exception to parasitic infaction being helminthic or otherwise, the resultant effect being a cancomitant loss to fish population also to man and other animals. It has become a problem to deep concern because fishes get parasitised by different helminth parasites of which trematodes infection is peculier. Infection makes them ill developed and less nutritive. To overcome the loss of fish food, a multifacet strategy is needed. There is a great variety and diversity among the tematodes which makes the group of increased interest in studies of host relationship and speciation and phylogeny.

Fishes get parasitised by helminthes cestodes, Nematodes and Trematodes etc. Infection of Trematodes is peculior in fishes. According to their mode of life, they are of monogenetic or digenetic. The digenetic trematodes complete their life cycle in two host first is fish and another is some water bodies like snail or other molluses etc. After infection fishes become ill developed and less nutritive so known and unkonwn parasites must be investigated to check their life cycle. Their adult forms can be observed only in fish host, we already known large number of digenetic -

trematodes from fishes but our knowledge is still incomplete even in regard to the adult trematode and more inadequate in regard to their life cycle and larval stages where ever ext-ensive survey have been made. It is seen that number of sp-ecies of digenetic trematode approaches the number of species of fishes examined ( Manter 1957) and survey conducted in different laboratories in India also support this view. A large number of Indian workers have worked out the trematodes funa of fishes of various regions of country. However survey of trematodes have been made by Agarwal S.C. and Agarwal G.P., (1977-1980) Agarwal L.N. and Agarwal G.P.(1980-1982) and Dwivedi U.K. and Agarwal S.C.(1983-1986), Gupta P.C. and Govind H.(1985), and Gupta S.P.(1951), Verma B.P. amd sahay V.(1985) Ubgade and Agarwal(1980) Agarwal and Kumar(1979-1981,1985) Saxena(1959) Pandey(1970-1975) Madhavi(1978) Sharma S.K. and Agarwal S.C.(1987-1990) etol and our knowledge about trematodes is still incomplete. District Kanpur bears ganga,Sengur rivers and ponds extensive survey of helminth parasites of fishes from the above resources and also purchased various fishes from fish market of Kanpur has been conducted from the month of February 1990 to 1993, this work comprise of only dis-cription of digenetic trematodes of fresh water fishes of Kanpur region. Therefore, in the present work entitled

"Helminth parasites of ( digenetic trematodes) fresh water fishes at Kappur." An attempt has been made to describe the parasite of digenetic trematodes at Kanpur.

# HISTORICAL REVIEW

Southwell (1913) described Isoparorchis trisimilitubis from Wallago attu and Puntius (Barbus) tor from Calcutta.

Southwell and Prasad (1918) described Clinostomum piscidium from Nandus nandus and Colisa (Trichogaster) fasciatus from Bengal and Poona.

Verma (1927) described Opisthorchis pedicellata from Rita rita and Bagarius bagarius (B. yarrellii). In 1936a-b, described Bucephalopsis fusiformis from Eutropiichthys vacha, B. garuai from Pangasius buchanani, Bucephalus tridentacularia from Aoria (Macrones) aoria and Aoria (Macrones) seenghala; B. aoria from Aoria (Macrones) aoria from Allahabad.

Thapar (1930) described Opisthorchis gomtia (Gomtia piscicola) from Bagarius bagarius (B. yarrelli) from Lucknow. In 1960, he described Caballeroia indica from Cirrhina fulungel from Lucknow.

Srivastava (1933) described Genarchopsis (Progonus) piscicola, G. (Progonus) ovocaudatum from Channa (Ophiocephalus) punctatus; G. (Ophiocorchis) lobatum and G. (Ophiocorchis) singularis from Channa (Ophiocephalus) from Allahabad. In 1935a-c, he described Lecithaster indicus, L. extralobus from Hilsa (Clupea) ilisha, Haplorchoides (Haplorchis) attenuatum from Mystus (Macrones) seenghala, H. (Haplorchis) piscicola from Eutropiichthys vacha, H. (Haplorchis) gangeticum from Pseudotropius athenoides, H. (Haplorchis) silundi from Silondia gangetica; Faustula

(Orientophorus) brevichrus, F.(Orientophorus) gangeticus, F.(Orientophorus) ilishii and F.(Orientophorus) clupii from Hilsa (Clupea) ilisha from Allahabad in 1936, Asymphylodora indica from Channa (Ophiocephalus)punctatus from Assam; in 1937, Polyorchitrema piscicola from Eutropiichthys vacha and in 1938a-c Bucephalus indicus and B. gangeticus from Mystus (Macrones) seenghala, Bucephalopsis belonea and Phyllodistomum lewisi from Xenentodon (Belone) strongylura, Nicollodiscus gangeticus, Orientodiscus lobatum, O. jumnai from Silondia gangetica from Allahabad, and in 1939, described Polyorchitrema piscicola from Eutropiichthys vacha from Allahabad.

Chatterji (1933) described Orientocreadium (Ganada) clariae, Masenia collata and Astiotrema spinosa from Clarias batrachus from Rangoon, in 1938, he described Protocladorchis (Maccallumia) burmanica from Pangasius pangasius from Rangoon.

Harshey (1933) described Opegaster anguilli from Anguilla bengalensis from Allahabad; in 1937 described O. mastacembeli and O. mehrii from Mastacembelus armatus from Jabalpur.

Pande (1934) described Orientocreadium indicum from Heteropneustes fossilis (Syn. Heterobranchus longifilis) and Pangasius buchanani from Allahabad; in 1937a-b, he described Allocreadium handiai from Channa (Ophiocephalus) punctatus, Pleurogenoides (Pleurogenes) pabdai from Callichrous pabda; Opegaster beliyai from Gobius giuris from Allahabad; in 1938a-b, Allocreadium nicolli from Gobius giuris, A. kosia from Puntius (Barbus) chilinoides, A. schizothoracis from Schizothorax

micropagon, and A. mahaseri from Puntius (Barbus) tor from Allahabad. Pande and Shukla (1976) described Haplorchoides pearsoni from Channa punctatus and H. mehrai from Mystus vittatus from Lucknow.

Dayal (1935) described Haplorchoides (Monorchotrema) taakree from Pseudotropius taakree from Lucknow; in 1938a-c, he described Astiotrema dassia from Clarias batrachus, Gorgotrema barbius from Puntius (Barbus) sarana, Orientocreadium (Neoganada) barabankiae from Clarias batrachus, Orientocreadium (Nizamia) hyderabadi from Channa (Ophiocephalus) punctatus, Phyllodistomum (Phyllochrous) macronius from Mystus (Macrones) tengara from Lucknow and Hyderabad; in 1948 described Bucephalopsis macronius from Mystus (Macrones) seenghala, B. sinhai from Eutropiichthys vacha, B. thapari from Pseudotropius taakree, Neubucephalopsis bagarius from Bagarius bagarius (Bagarius yerrellii) from Lucknow, in 1949 described Orientocreadium (Ganadotrema) indica from Heteropneustes fossilis, O. (Neoganada) secunda from Clupisoma garua, Opisthorchis (Gomtia) gagatia from Gagatia cenia, O. (Gomtia) lucknowia from Bagarius bagarius (B. yarrellii), Phyllodistomum vachius from Eutropiichthys vacha, H. (Plesiodistomum) callichrous from Callichrous pabda, Haplorchoides (Pseudohaplorchis) macrones from Mystus (Macrones) seenghala from Allahabad and Lucknow; in 1950 described Eucreadium eucreadium from Eutropiichthys vacha, Neopodocotyle indica from Callichrous bimaculatus from Lucknow. Dayal and Gupta (1953) described Ganeo gobindia from Wallago (Wallagonia) attu from Lucknow.

Bhalerao (1936) described Isoparorchis hyselobagri from Ambsis nama, Channa (Ophiocephalus) gachua, Channa (Ophiocephalus) marulius, Channa (Ophiocephalus) punctatus, Channa (Ophiocephalus) striatus, Gobius giuris, Mastacembelus armatus, Notopterus notopterus Lucknow; in 1937, he described Phyllodistomum sp. from Channa (Ophiocephalus) marulius, Mastacembelus armatus, Xenentodon (Belone) cancila, Helostomatis sakrei from Labeo calbasu, Cleoptodiscus (Neocladorchis) poonaensis from Puntius (Barbus) debsoni, Bucephalopsis karvei from Xenentodon (Belone) cancila from Poona; in 1942 described Clinostomum dasi from Heteropneustes (Saccobranchus) fossilis and C. prashadi from an unidentified fish from Hyderabad.

Mehra (1941a-b) described Opisthorchis pedicellata minuta fr. Mystus seenghala and Wallago attu, Opisthorchis gomtii from Bagarius bagarius (B. yarrellii) from Allahabad; in 1962 he described Hysterolecitha indica from Channa (Ophiocephalus) punctatus.

Kaw (1943) described Pleurogenoides (Pleurogenes) pabdai from Callichorous pabda from Kashmir; in 1944 he described Crepidostomum indicum from Schizothorax niger and in 1950 described Allocreadium nemachilus from Nemachilus kashmirensis, Phyllodistomum loossi from Schizothorax socinus and Schizothorax sp., Allocreadium schizothoracis from Schizothorax sp., Clinostomum schizothoraxi from Oreinus sinuatus, Schizothorax socinus and Neascus yetastai from Orenius sinasus, Schizothorax micropagon, Schizothorax niger and Schizothorax socinus from Kashmir.

Gupta (1950) described Allocreadium thapari from Rita rita from Hardoi; in 1951a-e, he described Cephalogonimum heteropneustus from Heteropneustes fossilis, Phyllodistomum singhiai from Mastacembelus armatus, Orientocreadium (Ganadotrema) mahendrai, O.(Ganadotrema) vermai from Clarias batrachus, O. (Ganadotrema) phillipai, Genarchopsis (Ophiocorchis) dasus, G.(Ophiocorchis) indicus from Channa (Ophiocephalus) punctatus, Orientocreadium (Macrotrema) macroni from Mystus (Macrones) cavasius from Lucknow and Saharanpur; in 1955a-b, Gauhatiana batrachii from Clarias batrachus; Masenia fossilisi from Heteropneustes fossilis; M. dayali from Clarias batrachus Haplorchoides seenghali from Mystus (Macrones) seenghala; Polydistomum vittatusi from Mystus (Macrones) vittatus, Thaparotrema vittalani, Assamia gauhatiensis, Haplorchoides ritai, H. brahmputraensis from Rita rita; Brahamputrotrema punctata from Channa (Ophiocephalus) punctatus from Assam; Neopecoelina saharanpurensis from Mystus (Macrones) cavasius and Heteropneustes fossilis from Saharanpur. Oudhia horai from Heteropneustes fossilis from Manipur state, Allogomtiotrema (Gomtiotrema) attu from Wallago (Wallagonia) attu, Neobucephalopsis eutropiichthis from Eutropiichthys vacha, Haplorchoides gomtiensis from Silondia gangetica; Neobucephalopsis pseudotropei, N. gauhatiensis from Pseudotropius garua, Lucknoides cavasius from Mystus (Macrones) cavasius from Lucknow; in 1958a-b, Namacreadium (Allocreadium) kamalai from Oxygaster (Chela) bacaila and Allocreadium lohrai from Macrognathus (Rhynchobdella) aculeata from Lucknow; in

1961 he gave a reference list of trematodes parasites of fresh water fishes of India; in 1963 described Lucreadium cameroni from Oxygaster (Chela) gora, Allocreadium makundi from Puntius (Barbus) sarana from Banaras. Gupta and Agrawal 1967a-b described Macrolecithus indicus from Puntius sophore, Asymphylodura ritai from Rita rita from Lucknow, in 1968 they described Pseudoparamacroderoides seenghali from Mystus (Macrones) seenghala from Lucknow. Gupta and Chakravarty (1967) described Neopodocotyle lucknowensis from Puntius (Barbus) sarana from Lucknow. Gupta and Verma in 1977 described Allocreadium mrigalai from Cirrhina mrigala; A. saranai from Puntius (Barbus) sarana, A. baranai from Barilius barana and Asymphylodora punctatusi from Channa (Ophiocephalus) punctatus from Lucknow.

Srivastava (1951a-b) described Asymphylodora kedari (Syn. A. tincae) from Puntius sophore, Fumasenia moradabadensis from Heteropneustes fossilis from Hardoi and Moradabad respectively.

Singh (1959) described Echinostoma thapari from Notopterus chitala from Lucknow, in 1957 he described Diplostomum elongatus from Trichogaster fasciatus.

Chatterji (1957) described Haplorchoides (Haplorchis) parini from Wallago attu and Polyorchitrema entropiichthi from Eutropiichthys vacha from Rangoon.

Jaiswal (1957) described Phyllodistomum parorchium from Gobius giuris, P. indicum from Heteropneustes fossilis, Phyllodistomum sp. from Labeo fimbriata, Clinostomum macrosomium from Channa (Ophiocephalus) striatus, C. mastacembeli from

Mastacembelus armatus, Euclinostomum channai from Channa (Ophiocephalus) marulius, Echinostomum heptacaecum from Channa (Ophiocephalus) punctatus, Orientocreadium (Neoganada) barabankiae from Clarias batrachus, Haplorchoides attenuatum from Mystus (Macrones) tengara; in 1967 Derogenes hyderabadensis from Channa (Ophiocephalus) punctatus from Hyderabad. Jaiswal and Narayan (1971) described Azygia marulii from Channa (Ophiocephalus) marulius from India.

Saxena (1958a-b) described Orientocreadium raipurensis, O. dayalai from Clarias batrachus, Allocreadium spindale from Mastacembelus armatus from Raipur; in 1960 he described Orientocreadium umadasi from Clarias batrachus from Raipur.

Agarwal (1959) reported Opisthorchis pedicellata (O. mehrai, O. thapari) from Rita rita and Wallago attu from India. Tiwari (1959) described Eurostomum armati from Mastacembelus armatus.

Srivastava (1960a-b) described Emoleptalea loossi and E. dollfusi from Heteropneustes (Saccobranchus) fossilis and Allocreadium ophiocephali from Channa (Ophiocephalus) punctatus from Raipur.

Gupta and Srivastava (1960) described Faustula chauhani from Hilsa ilisha from Allahabad.

Motwari and Srivastava (1961) described Phyllodistomum chauhani from Mystus oar and Mystus (Osteobagrus) seenghala, Phyllodistomum tripathi from Bagarius bagarius from India.

Rai (1962) described Allocreadium dollfusi, A. singhi, A. hirnai from Puntius (Barbus) tor from Kiran near Katangri and Sihora in India; in 1964 he described Azygia stunkardi from Channa (Ophiocephalus) striatus from Jabalpur.

Srivastava (1962a-b) described Rhynchocreadium aculeatum from Mastacembelus (Rhynchobdella) aculeata, Pycnadena komiai from Oxygaster gora from India; in 1963a-b, he described Bucephalus bagarius, B. allahabadensis, B. tritentacularis from Bagarius bagarius, Folliorchis vermai from Eutropiichthys vacha from Allahabad and Bhagalpur; in 1968 Nicolla (Crowcrocaecum allahabadensis from Mastacembelus armatus and Anguilla bengalensis N.(Crocrocaecum) C. indicum and opegaster Jamnica from A. bengalensis from Allahabad.

Srivastava and Ghosh (1967) described Paramacrolecithus rasborai from Rasbora rasbora from Assam; in 1972 he described Birendralebes krishnakanta from Ambassis nama and A. ranga from Dhakuria lake, Calcutta. Srivastava and Singh (1967) described Eucreadium jhingarani from Puntius chagunio from river Sone, Bihar.

Agrawal (1963) described Masenia vittatusia and M. gomtia from Mystus vittatus from Lucknow; in 1964a-b, he described Prosotocus mastacembeli from Mastacembelus armatus, Allocreadium heteropneustusius from Heteropneustes fossilis, Haplorchoides macronis from Mystus (Macrones) seenghala, Eumasenia ritai from Rita rita from Lucknow; in 1966 Genarchopsis punctati from Channa (Ophiocephalus) punctatus, Bucephalopsis garuai and Phyllodistomum tripathi from Pseudotropius garua from Lucknow.

Simha and Pershad (1964) described Azygia asiatica from Channa (Ophiocephalus) punctatus from Hyderabad.

Kakaji (1968) described Pleurogenoides (Pleurogenes) attui from Wallago (Wallagonia) attu from Lucknow; in 1969a-b, he described Bucephalus octotentacularis from Wallago (Wallagonia) attu, Cephalogonimus seenghalus, Orientocreadium (Macrotrema) seenghali and Genarchopsis cameroni from Mystus seenghala, Allocreadium catlai from Catla catla, Pseudoparamacroderoides vittatusi from Mystus vittatus from Lucknow and Genarchopsis cuchiai from Amphipnous cuchia from Muzaffarnagar. Allocreadium fasciatusi from Colisa (Trichogaster) fasciatus from Lucknow and A. guptai from Rita rita from Varanasi.

Sircar and Sinha (1969) described Neopodocotyle spinipora from Rita rita; in 1970 he described Masenia ritai from Rita rita from Patna.

Dwivedi (1970) described Branamputrotrema batesia from Channa (Ophiocephalus) punctatus from Jabalpur; in 1978 he described Coitocaecum orientalis from Nandus nandus from Jabalpur. Gupta and Kumari (1970a-f) described Opisthorchis pedicellata from Mastacembelus armatus, Helostomatis cirrhini from Labeo dero and Cirrhinus mrigala, Koparhynchus nelsoni from Xenentodon cancila, Hamacreadium manteri from Oxygaster (Chela) bacaila, Chelatrema smythi from oxygaster (Chela) bacaila from Ropar, Nagal, India.

Pandey (1970) described Eucreadium gangi from Colisa (Trichogaster) fasciatus from India; in 1972 he described

Tetracotyle lali from Puntius ticto, Orientocreadium batrachoides from Channa punctatus and Phyllodistomum vachius from Heteropneustes fossilis from Lucknow; in 1973 described Neopodocotyle balliaensis from Labeo calbasu and N. dayali from Puntius sarana from India.

Rai (1971a-b) described Opisthorchis gorakhpurensis from Mystus vittatus, Neopodocotyle mehrai from a fresh water fish Puntius sophore and P. sarana from Gorakhpur.

Agarwal and Verma (1972) described Eucreadium varanasi from Oxygaster (Chela) gora from Varanasi; in 1984 they described Faustula makundi and F. indica from Hilsa (Clupea) ilisha from Varanasi.

Gupta and Sharma (1972) described Fellocovitellosum indicum from Xenentodon (Belone) belone, Steganoderma indicus from Xenentodon (Belone) cancila from Ratanagiri.

Verma (1973a-b) described Stomachicola mastacembeli from Mastacembelus armatus, Eucreadium guptai from Oxygaster (Chela) bacaila, Astiotrema heteropneustusi from Heteropneustes fossilis and Helostomatis indica from Barilius barana from Lucknow.

Fotedar and Dhar (1974) described Allocreadium from Schizothorax niger from Kashmir.

Chauhan (1975) described Bucephalopsis chauhani and B. gaurii from Xenentodon cancilla from India.

Dhar (1975) described Astiotrema fotedari from Labeo dero from Kashmir. Dhar and Kharoo (1984) described Allocreadium fotedari from Schizothorax niger from Kashmir.

Dwivedi (1975) described Opedunculata armatus from Mastacembelus armatus from India; in 1978 he described Coitocaecum orientalis from Nandus nandus from India. Dwivedi and Dwivedi (1982) described Opedunculata sapani from Mastacembelus armatus.

Singh and Sinha (1975) described Asymphylodora longicaeca (Syn. A. tincae) from Puntius sarana and Phyllodistomum longicephalus from Setipinna phasa from Bihar; in 1976 they described Rhipidocotyle vachius from Eutropiichthys vacha from Bihar; in 1977a-b Bucephalus tetratentacularis from Sciaena coitre and other two species from fresh water fishes of Bihar.

Kumari and Srivastava (1975) described Pycnadena bariliusi from Barilius gatensis from Calcutta.

Karyakarte and Yadav (1976) described Godavaritrema indica from Mystus (Macrones) seenghala from Ratanagiri.

Lal (1976) described Jamunatrema indica from Channa punctatus from Patna.

Agarwal and Kumar (1977) described Faustula varanasiensis from Hilsa (Clupea) ilisha; in 1979 they described Lucreadium thapari from Oxygaster (Chela) bacaila from Gorakhpur; in 1981 Gangatrema chauhani from Mastacembelus armatus from Varanasi; in 1983a-b Pleurogenoides anabasi from Anabas testudineus and Pseudoparamacroderoides raychaudhurii from Mystus vittatus from Varanasi; in 1985 Bucephalus purshottami and B. bharatica from Bagarias bagarius from Varanasi; in 1986 Neopoducotyle gorakhpurensis from Amphipnous cuchia from Gorakhpur; in 1987 Opisthorchis dayali from Rita rita from Varanasi.

Madhavi (1978) described life history of Genarchopsis goppo from Channa marulius.

Nama (1978) described Hemipera ovocaudata from Channa punctatus from India

Agarwal and Agrawal (1979) described Orientodiscus mastacembeli, from Mastacembelus armatus, in 1980a-d they described Masenia yamagutii, Gangatrema ritai from Rita rita and Orientodiscus orchhaensis, Helostomatis bundelkhandensis from Mastacembelus armatus from Jhansi in 1988 Dactylostomum jhansiensis from Mastacembelus armatus from Jhansi.

Agarwal and Agarwal (1979) described Bucephalus indica from Bagarius bagarius from Raipur.

Bhadauria and Dandotia (1979) described Opisthorchis gwaliorensis from Bagarius bagarius and Opisthorchis spinutum from Wallago attu from Gwalior. Dandotia and Bhadauria (1979) described Bhramputrotrema gwaliorensis from Puntius sophore from Gwalior.

Singh and Prashad (1979) described Stylotrema multivitellaria from Mystus striatus from Patna.

Agarwal and Agrawal (1980) described Neopodocotyle kulpaharensis from Channa punctatus from Kulpahar (District, Hamirpur); in 1981 they described Neoeucreadium mahobaensis from Oxygaster bacaila from Mahoba (District Hamirpur); in 1982 Bundelatrema orchhaensis from Puntius sarana from Orchha (District Tekamgarh); in 1984 Eucreadium kulpaharensis from

Channa punctatus from Kulpahar (district Hamirpur).

Agarwal and Singh (1980) described Opisthorchis thapari from Bagarius bagarius from Lucknow; in 1981 they described Transversotrema chauhani from Nandus nandus from Lucknow.

Gupta and Puri (1980) described Allocreadium calbasii from Labeo calbasu, A. manteri from Anabas testudineus and Polyorchitrema inglisi from Eutropiichthys vacha.

Kalyankar and Deshmukh (1980) described Allocreadium indicum from Labeo rohita from India.

Kumar and Agarwal (1980) described Qudhia hardayali from Mystus vittatus from Varanasi; in 1985 they described Faustula hilsai and F. pyriformis from Hilsa ilisha from Varanasi.

Agrawal (1980) made a survey of Helminth parasites (Digenetic trematodes) of fishes of Bundelkhand region. Agrawal and Agarwal (1983) described Neopodocotyle chauhani from Puntius sarana from Jhansi; in 1984 they described Cephalogonimum hanumanthai from Mystus vittatus from Jhansi and a note on the validity of certain species of Eucreadium Dayal, 1942; in 1988 Dactylostomum harishii from Mastacembelus armatus from Jhansi. Agrawal and Sharma (1988) described Nicolla fotedari from Rita rita from Jhansi, in 1989a-b Paradictinogryptus jhansiensis from Channa marulius from Jhansi. Nicolla ritai from Rita rita from Jhansi.

Gupta and Govind (1983) described Eucreadium hemlatae from Chela gora; in 1985 they described Haplorchoides kherai from

Rita rita, H. srivastavai from Wallago attu, H. piscicola Srivastava from Mystus vittatus from Kanpur. Gupta and Singh (1985) described Astiotrema gangetica from Clarias batrachus from Kanpur.

Srivastava, Saxena and Kumar (1983) described a Eucreadium pandeyi from a fresh water eel, Mastacembelus armatus from Doon valley.

Tewari (1983) described Oudhia hanumanthai from Rita rita from Meerut.

Agrawal and Agarwal (1984) described Oudhia kanungoi from Rita rita; Pseudoparamacroderoidae keni from Mystus vittatus from Kulpahar (District Hamirpur).

Mehra, Dhar and Kharoo (1984) described Hysterolecitha ophiocephali from Ophiocephalus punctatus.

Ahmad (1984) described Satyapalia guptai from Rita rita S. magnous from Wallago attu, S. thapari from Mystus (Macrones) seenghala and S. vinodae from Clarias batrachus from India.

Gupta and Saxena (1985) described Opisthorchis thapari from Mystus (Macrones) oar from India.

Verma and Sahay (1985) described Genarchopsis avitellarium from Channa (Ophiocephalus) punctatus from Ranchi.

Maurya and Agarwal (1988) described Bucephalus gangai and B. dasashwamedhai from Mystus oar; in 1989 they described Opedunculata kashiensis from Mastacembelus armatus and Pseudoparamacroderoides varanasiensis from Mystus vittatus, Bucephalus varanasiensis from Bagarius bagarius and B. aori from Mystus oar.

Agrawal and Sharma (1989) described Gangatrema ritai from Rita rita (Ham.) at Rath Hamirphur; Allocreadium duknwaai from Rita rita (Ham.) at Jhansi; Pychadena indica & Pychadena betwai from Channa marulius (Ham.) at Jhansi. Alloereadium dograi from Mastaeembelus armetus (Lac.) from Dograi Dam at Jhnasi, redescribed Genorchopsis camerono from Mastacembelus armetus at Jhansi. In (1990) Pseudoarpidogaster betwai from Tor tor (Ham) at Jhansi. Neodicrocoelium gyprasadai from Channa marulias (Ham.) Pyenadena linton from Tor tor at Jhansi. In (1991) Pseudoorientodiscus laxmibaii from Pantius sarana (Ham.) at Jhansi.

Lokhande (1990) described Podocotylaidus dorabus from marine fish cynoglossus ologolepis in India.

Zdzitowiecki, Krzysztol (1990) Redescribed Discoverytrema morkowskii Ghson (1976) and discription of Discoverytrema gibsoni from H. fossilis (Bloch.).

Gupta and Jain (1991) described Uterovesiculurus skrjabin from marine fish at Bay of Bengal, In (1992) described Eugraulitrema hamiltoni from marine fish Engraulis hamiltoni (Cuv. & Val.) at Orissa, India.

Maurya and Agarwal (1992) described Bucephalus bear from Bagarius bagarius at Varanasi, India.

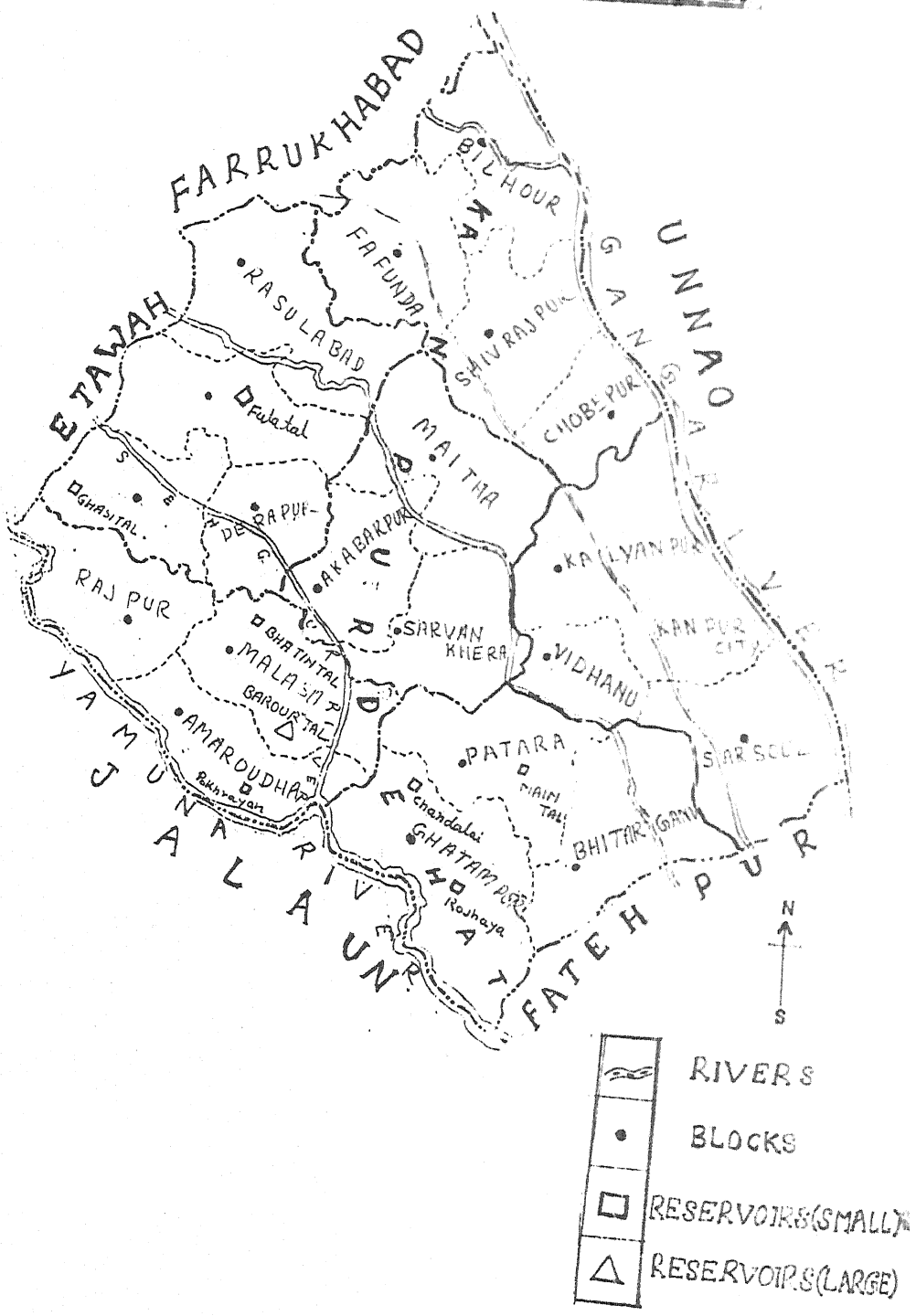
Sujatha and Madhavi (1993) described comparison of digenean faunas of sillaginid fishes from inshore and offshore waters of Visakhapatnam Coast, Bay of Bengal (India).

## MATERIAL AND METHOD

The material incorporated in the present thesis has been obtained from the fresh water fishes of district Kanpur of Uttar Pradesh (India). The fishes were collected from river Ganga, river sengur, fish market Ghatampur, Rojhaya tal, Chandalai tal, Ghatampur, Bhatintal Malasa, Baraurtal malasa, Ghasin tal, Main tal Patara, Phokhrayan tal, Sukhai tal, Pokhrayan, Amraudha, and also those purchased from local fish markets.

For the collection of digenetic trematodes the eyes and visceral organs viz. heart, gut, kidney, liver, air bladder, intestine, stomach, etc. of the fish were taken out and kept separately in petridishes, contents, decanted the water several times and trematodes were collected by fine glass dropper. The trematodes were fixed in 70% or 90% alcohol, under coverglass with gentle pressure for 24 hours. Whole mounts were stained in aceto-alum carmine cleared in clove oil/xylene and mounted in Canada balsam. Mounted slides were dried in incupator maintained at 37°C. All the measurements were taken in millimeter (m.m.), from the mounted specimens by using occulometer and stage micrometer slide. Sketches were made with the help of Camera lucida.

# DISTRICT KANPUR



MAP OF THE DISTRICT KANPUR

## HOST PARASITIC LIST

| S. No. | Host | Locality | Parasites | Location |
|---|---|---|---|---|
| | Family : Belonidae | | | |
| 1. | Xenentoden cancila (Ham.) | Fish market Kanpur | x | x |
| | Family : Cyprinidae | | | |
| 2. | Catla catla (Ham.) | Fish market Kanpur | x | x |
| 3. | Cirrhinus mrigala (Ham.) | Fish market Kanpur, Ghatampur ponds Chandali, Roochhayatal Ghatampur | x | x |
| 4. | Labeo calbasu (Ham.) | Fish market Ghatampur | x | x |
| 5. | Labeo gonius (Ham.) | Fish market Kanpur | x | x |
| | | Fish market Pokhrayan | x | x |
| 6. | Labio rohita (Ham.) | Fish market Kanpur | Neopodocotyle laxmibaici n.sp. Neopodocotyle hunumanthai n.sp. | Intestine |
| 7. | Oxygater bacaila (Ham.) | Fish market Kanpur | Eucreadium satpali n.sp. | Intestine |
| 8. | Oxygaster gora (Ham.) | Fish market Kanpur | x | x |

| | | | | |
|---|---|---|---|---|
| 9. | Puntius sarana (Ham.) | Fish market Kanpur, | Apocreadium maxicanum | Intestine |
| | | Fish market Ghatampur | Pseudoorientodiscus sengurai n.sp. | Intestine |
| 10. | Puntus sophore (Ham.) | Fish market Kanpur, | Prosorhynechoides karvai | Intestine |
| | | Fish market Kanpur, | Prosorhynechoides garvai | Intestine |
| | | Fish market Kanpur | Allocreadium thaprai | Intestine |
| 11. | Tor tor (Ham.) | Fish market Kanpur, | Allocreadium kosia | Intestine |
| | | Fish market Kanpur | Allocreadium fasciatusi | Intestine |
| | Family : Mastaeembelidae | | | |
| 12. | Mastacembelus armatus (Lac.) | Fish market Kanpur, | Macradenina mestacembeli n.sp. | Stomach |
| | | Fish market Kanpur, | Macradenina thaprai n.sp. | Stomach |
| | | Fish market Kanpur | Nicolla chauhani n.sp. | Intestine |
| 13. | Nandus nandus (Ham.) | Sukhai Tal Pokhrayan | x | x |
| | Family : Notopteridae | | | |
| 14. | Notopterus notopterus (Ham.) | Rojhaiya Tal Ghatampur | x | x |
| | | Fish market Kanpur | x | x |
| | Family : Ophiocephalidae | | | |
| 15. | Channa marulius (Ham.) | Fish market Kanpur | Podochorchis gangi n.subgenus n.sp. | Intestine |
| | | Fish market Kanpur | Podochorchis marullai n.sp. | Intestine |

| | | | | |
|---|---|---|---|---|
| 16. | Channa punctatus (Bl.) | Fish market Kanpur | x | x |
| 17. | Channa striatus (Bl.) | Fish market Kanpur | x | x |
| | Family : Sisaridae | | | |
| 18. | Bagarius bagarius (Ham.) | River Ganga Kanpur, | Bucephalus kanpurensis n.sp. | Stomach |
| | | River Ganga Kanpur, | Bucephalus vinodi n.sp. | Stomach |
| | | Fish market Kanpur | Ophisthorchis pedicellata | Gall bladder |
| 19. | Eutropiicthys vacha (Ham.) | Fish market Kanpur | x | x |
| 20. | Heteropneustes fossilis (Bl.) | Fish market Kanpur | x | x |
| 21. | Mystus tengara (Ham.) | Fish market Ghatampur | x | x |
| | | Fish market Kanpur | x | x |
| 22. | Mystus vittatus (Bl.) | Fish market Kanpur | Podochorchis vittatusi n.sp. | Intestine |
| | | Fish market Kanpur | Allocreadium handiai | Intestine |
| | | Fish market Pokhrayan | Pycnadena pokhrayansis n.sp. | Intestine |
| | | Fish market Kanpur | Neodicrocoelium nirupmai n.sp. | Intestine |
| | | Fish market Ghatampur | Neopecoelina fotedarii n.sp. | Intestine |
| | | | Neopecoelina chadailai n.sp. | Intestine |
| 23. | Mystus seenghala (Sykes) | Fish market Bhognipur | x | x |

| | | | | |
|---|---|---|---|---|
| 24. | *Rita rita* (Ham.) | Fish market Kanpur | *Allocreadium nicolla* | Intestine |
| | | Fish market Kanpur | *Allocreadium isoporum* | Intestine |
| | | Fish market Kanpur | *Allocreadium duknwai* | Intestine |
| | | Fish market Kanpur | *Ancylocoelium ritai* n.sp. | Intestine |
| | | Fish market Kanpur | *Nicolla halicoeri* | Intestine |
| | | Fish market Kanpur | *Nicolla indica* | Intestine |
| | | Fish market Kanpur | *Nicolla skorizabini* | Intestine |
| | | Fish market Kanpur | *Nicolla dayali* n.sp. | Intestine |

# DESCRIPTION OF TREMATODES

FAMILY ALLOCREADIIDAE

Allocredium duknwai Agrawal and Sharma 1989

( Plate No - 1 )

Host : Rita rita ( Ham.)

Location : Intestine

Locality : Fish market Kanpur

No of fish examined : 300

No of fish infected : 1

No of specimen collected : 5

## Description

Body elongated, smooth with narrow anterior and broad pos-terior ends. Oral sucker subterminal, spherical or sub sph-erical. Ventral sucker spherical or subspherical pre equato-rial, muscular, larger than oral sucker. Pre pharynx present. Pharynx globular muscular. Oesophagus long tubular. Intestinal caeca terminating near posterior end of body. Testes entire, tandem or subpherical ovoid, tandem or oblequely tandem, se-perated, unequal. Cirrus sac saccular or elongated, anterior to ventral sucker. Vesicula seminalis samll. Pars protatica small surrounded by a large number of prostate gland cells. Ejaculatory duct small tubular. Ovary oval, or rounded, post-erior to ventral sucker. Receptaculam seminis post ovarian.

Vitelline follicles small extending from anterior end of body up to posterior end of body. Uterus arises from ootype may entend up to posterior testes then turns anteriorly and opens at genital pore. Egg large, operculated ; Genital pore median post bifurcal.

Excretory bladder simple, tubular; exeretory pore terminal.

## MEASUREMENT

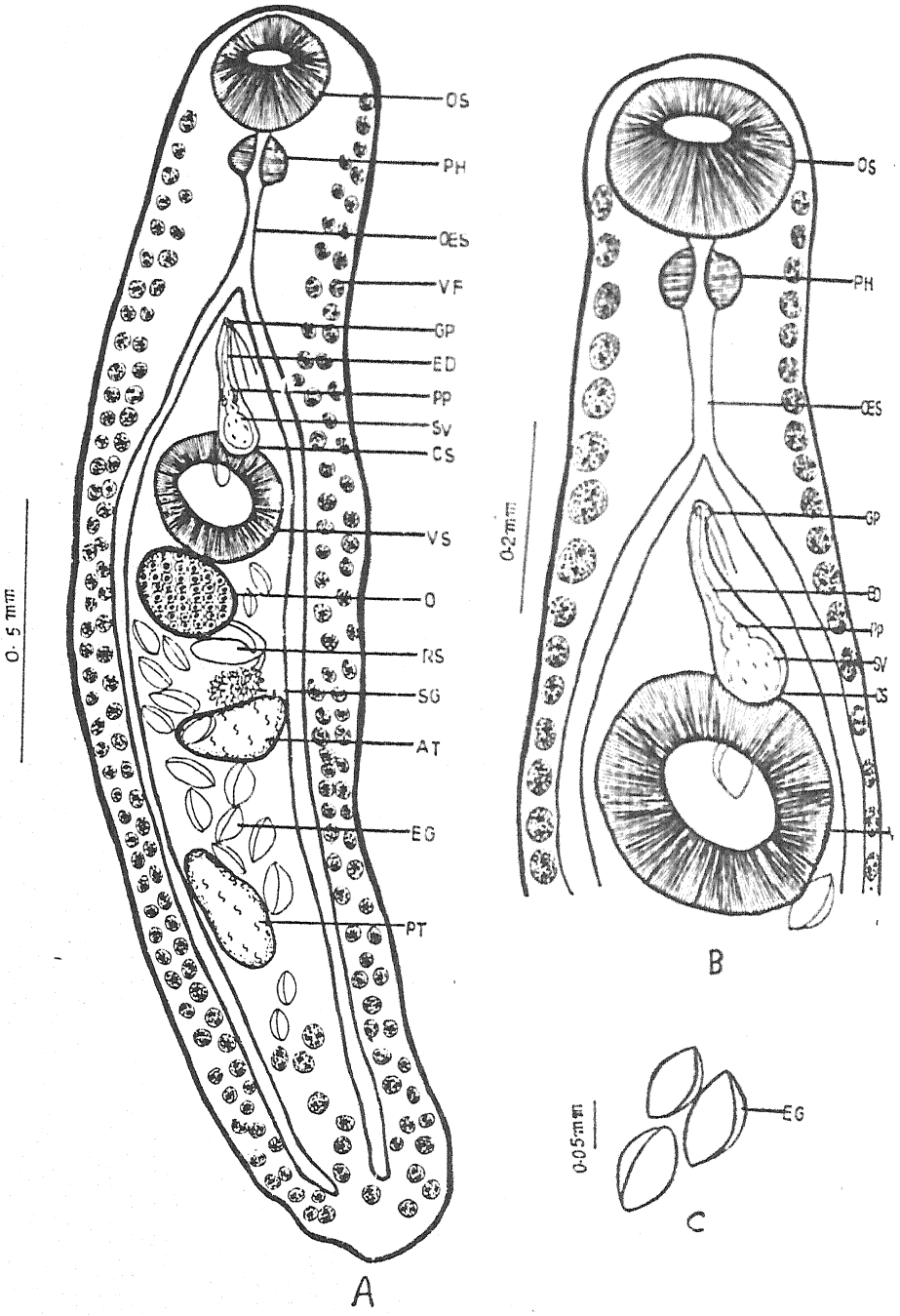
Body length, 2.40; width 0.560; oral sucker, 0.220x0.210 Ventral sucker,0.250x0,220;prepharynx, 0.01x0.025 ; Pharynx, 0.095x0.11; oesophagus, 0,22x0.025; Anterior testis, 0.215x0.115; posteiro testis,0.250x0.115; Cirrus sac, 0.260x0.075 ; Vesicular seminalis,0.070x0.055; Pars prostatica 0.45 x 0.020; ejaculatory duct,0.115x0.045; Egg,0.22x0.025.

## DISCUSSION

The present form belongs to genus *Allocredium* loss,1900. It closely resembles with *A. duKnwai* Agarwal and sharma, 1989, but differs from in having long oesophagus, in the size of oral&ventral sucker and extention of the vitelline folliles.

These characters have been considered as individual variation.

# PLATE - 1



Allocreadium duknwai Agarwal & Sharma 1989

( Plate no 1)

Fig. A : Entire worm.

Fig. B : Anterior part of body showing position of cirrus sac, ovary and caecal bifurcation enlarged( drawn from live specimen)

Fig. C : Egg enlarged .

## Allocreaolium fasciatusi Kakaji 1969

( Plate no - 2 )

Host : Tor tor ( Ham.)

Location : Intestine

Locality : Fish market Kanpur

No of fish examined : 70

No of fish infected : 1

No of specimen collected : 4

### Description

Body elongated, smooth, oral sucker subterminal, rounded, or spherical, larger than ventral sucker. Ventral sucker rounded spherical, muscular. Prepharynx absent. Pharynx small muscualr, rounded. Oesophagus absent. Intestinal caeca terminating at posterior end of body. Testes entire, subspherical, obliquily tandem, post equatorial, more or less equal. Cirrus sac sac--cular anterior to ventral sucker. Vesicula seminalis sac like bipartite, parsprostatica small surrounded by a large number of prostate gland cells. Ejaculatory duct narrow small. Ovary rounded, post equatorial, preterticular. Receptaculum sem--inis small, post ovarium, pre terticular. Vitelline follicles

extending from middle of ventral sucker up to hind end of body uterus arises from ootype extending up to ovary than turns anteriorly and opens at the genital pore. Egg few large & small operculated. Genital pore intracoecal between intes-tinal caeca and ventral sucker.

Exeretory bladder simple tubular exeretory pore terminal.

## Measurements

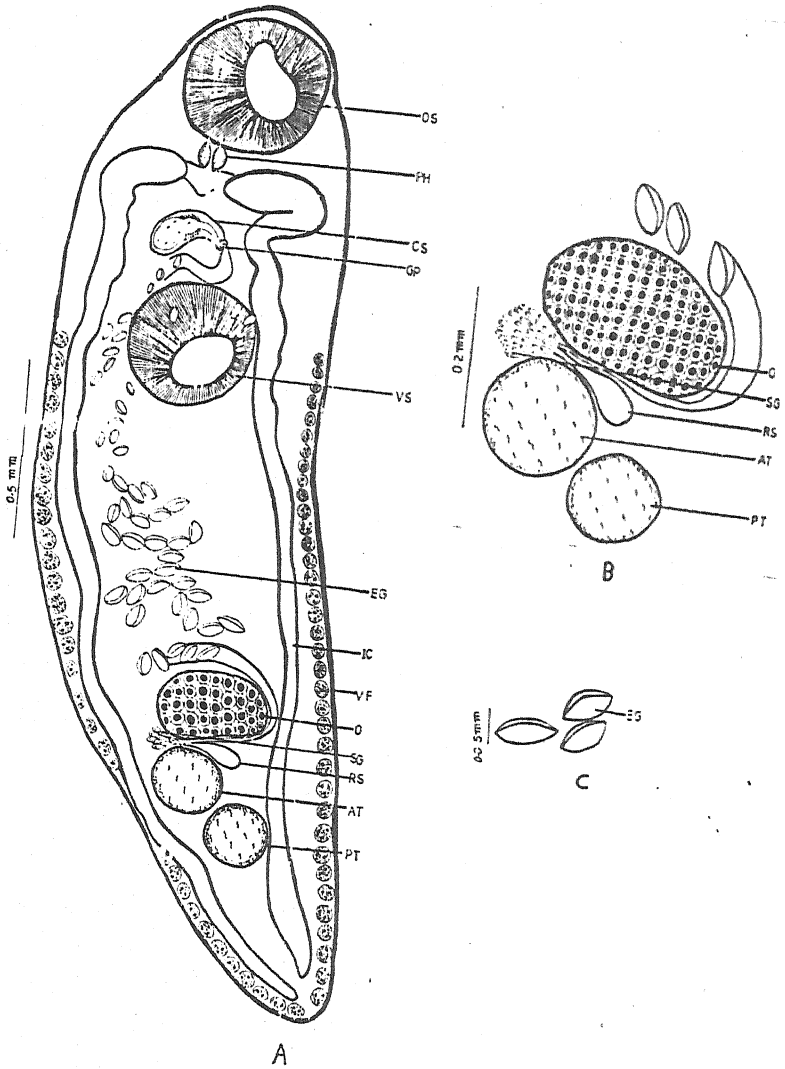
Body length, 2.875, width, p.775, oral sucker, 0.370 x 0.40; ventral sucker, o.35; pre pharynx absent. pharynx, 0.08x0.08 oesophagus absent ; Anterior testis, 0.175x0.075; Posterior testis, 0.165x0.165; cirrus sac, p.24x0.095; vesicular seminalis 0.09x0.065; pars prostatica, p.045x0.40; Ejaculatory duct, 0.080x0.020; ovary, 0.30x 0.185; Receptaculum seminis 0.15x 0.045; Egg, 0.06 x 0.035

## Discussion

The present form belongs to genus *Alloreaalium* Looss, 1900. It closely resemble with *A.fasiatusi* Kakaji, 1969, but differs from it in the ratio and size of ventral sucker and oral sucker. In the absence of pre pharynx and oesophagus size and position ovary, in the presence of receptaculum se--minis, of uterine coil and the extention of the vitelline follicles.

These characters have been considered as individual vari--ations. It is added as an additional host.

# PLATE - 2


OS
PH
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O
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A
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O
SG
RS
AT
PT
B
0.05mm
EG
C

Alloereadium fasciatusi

(Plate No 2 )

Fig. A : Entire worm

Fig. B : Posterior portion of body showing Ovary, Receptaculum, shell gland, and testes, etc. enlarged(drawn from live specimen)

Fig. C : Eggs- Enlarged

Allocredium handiai Pande 1937

( Plate No 3 )

Host : Mystus Vittatus ( cuv.&Bloch)

Location : Intestine

Locality : Fish market Kanpur

No of fish examined: 350

No of fish infected: 1

No of specimen collected : 3

Discription

Body elongated, smooth, with narrow posterior & broad ante-rior ends. Oral sucker subterminal, rounded, subspherical muscular larger than the ventral sucker. Ventral sucker, rounded or spherical, pre equatarial. Pre pharynx absent. pharynx globular muscular. Oesophagus absent. Intestinal caeca terminating at the hind end of body. Testes entire, spherical, or rounded, unequal, irregular, post equatorial, anterior testis larger than the posterior testis. Cirrus sac saccular elongated, anterior to ventral sucker. Vesicula seminalis large,sac like. Pars prostatica small surrounded

by large number of prostet gland cells. Ejaculatory duct narrow long. Ovary spherical or sub spherical, equatorial, close & post Ventral sucker. Receptaculum seminis small, preovarian. Vitelline folicles extending from hind end of ventral sucker up to posterior end of body. Uterus arises from ootype extending anterior testis then turns anteriorly and opens at genital pore. Eggs large operculated Genital pore at the intertinal bifurcation or hind end of pharynx.

Excretory bladder simple, tubular, excretory pore terminal.

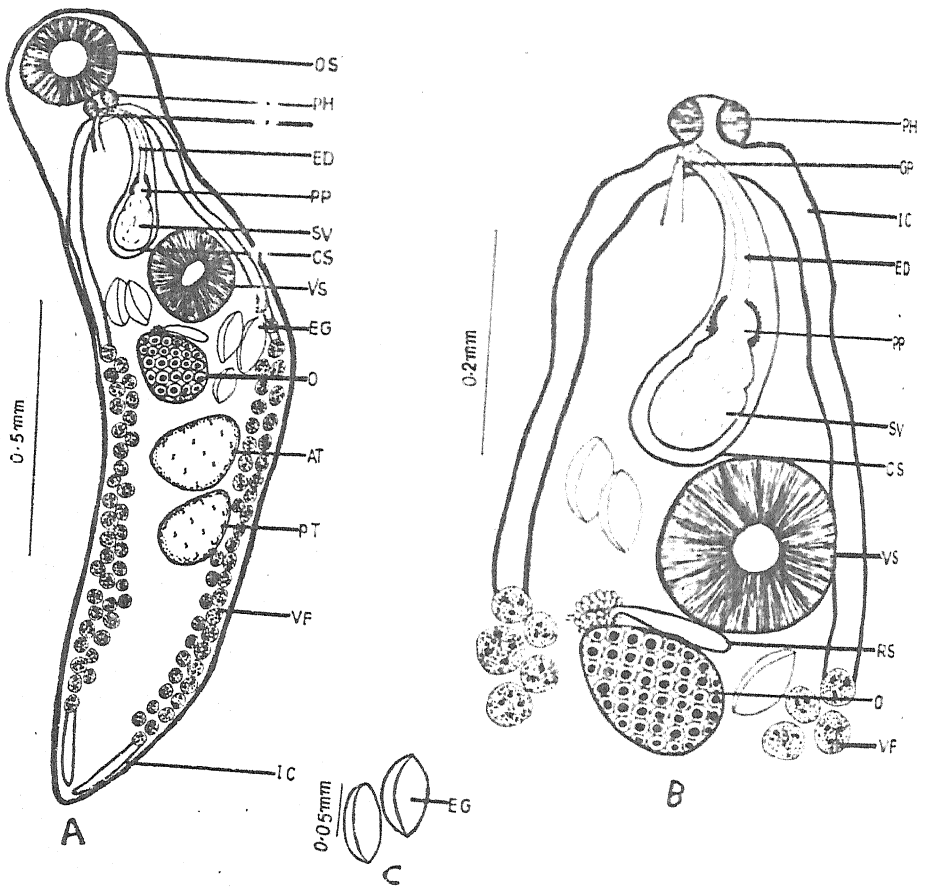
Measurements

Body length, 1.675; width, 0.385, oral sucker, 0.190x0.175; ventral, 0.180x0.165; Pre pharynx absent; pharynx 0.045x 0.07; oesophagus, absent ; Anterior testis 0.185x0.135; posterior testis 0.175x 0.110; cirrus sac 0.340 x 0.055; Vericula seminalis, 0.110x0.070, pars prostatica, 0.045 x 0.030; ejaculatory duct, 0.170 x 0.015 ; Ovary p.160x0.125,Receptaculum seminis, 0.08x0.02;egg,0.095x0.045.

## Discussion

The present form belongs to genus Allocredium loss, 1900. It closely resemble with A handiai pande 1937, but differs from it in having posterior testis smaller than anterior te--stis, Cirrus sac elongated, extending anterior to ventral sucker up to post pharyn geal in which long ejaculatory duct. Ovary post acetabular, equatorial. In the relative size of various organs. These characters have been considered as indi--vidual variation. For the first time being reported this host.

# PLATE - 3


OS
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PP
SV
CS
VS
EG
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AT
PT
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IC
0·5mm
A
PH
GP
IC
ED
PP
SV
CS
VS
RS
O
VF
0·2mm
B
EG
0·05mm
C

Allocreadium handiai pande 1937

(Plate No 3 )

Fig. A. : Entire worm

Fig. B. : Showing variations

(Based on Paratype)

Fig. C. : Egg enlarged.

## Allocreadium Kosia Pande 1937

(Plate No - 4 )

Host : Tor tor ( Ham.)

Location : Intestine

Locality : Fish market Kanpur

No of fish exam- : 70
-ined.

No of fish infec- : 1
-ted .

No of specimen : 5
collected

### Description

Body elongated smooth, rounded anterior and tappering post-
-erior ends. Oral sucker subterminal, rounded , or spherical, muscular. Ventral sucker pre equatorial rounded muscular. Prepharynx absent. Pharynx rounded, muscular. Oesophgus thick short or long, tubular. Intestinal caeca terminating posterior end of body. Testes entire, tandem post equatorial, anterior testis larger than posterior testis. Cirrus sac small, sac like vesicula seminalis bipartite, parsprostatica short, surrounded with large number of prostate gland cells. Ejaculatory duct

small narrow. Ovary rounded or spherical, just post ventral sucker, pre equatorial. Receptaculum seminis equatorial, posto-varian, pre testicular, sac like. Vitelline follicles exten-ding from pharyngeal region up to hind end of body. Confluent in post testicular region. Uterus arises from ootype extending upto middle of anterior testis or post vertral sucker, then turns anteriorly and opens at genital pore. Genital pore up to middle of intestinal bifurcation and ventral sucker. Eggs oval large operculated.

Exeretory bladder extending up to posterior testis exere-tory pore terminal.

Measurements.

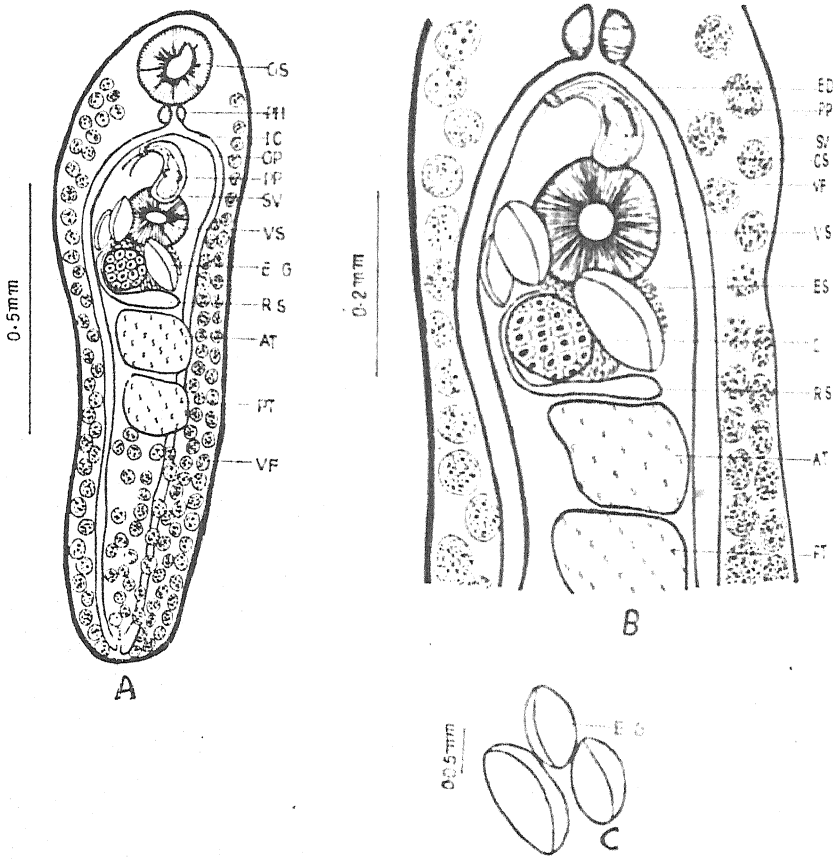
Body length 1.275;width 0.370,oralsucker,0.155x0.145; ventral sucker, 0.125x0.120; prepharynx absent ; pharynx, 0.045x0.060; oesophagus absent Anterior testis, 0.175x0.115; Posterior testis 0.140x0.110;cirrus sac, 0.16 x0.055;vesicula seminalis, 0.040x 0.035; pars prostatica, 0.030x0.025;Ejaculatory duct,0.065x 0.005;Ovary,0.085x0.080,Receptaculum seminis Absent; Egg,0.095x 0.045.

## Discussion

The present form belongs to genus *Allocreadium* loss 1900. It closely resemble with *A. Kosia* Pandey, 1937. But differs from it in having middle ventral sucker, in the position & shape of receptaculum seminis, position, size & shape of anterior testis, vitelline follicles extend up pharyngeal region to hind end of body.

These characters are considered as individual variation.

# PLATE - 4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## Allocreadium Kasia Pande 1937

(Plate No 4)

Fig. A. : Entire worm.

Fig. B. : Anterior part of body showing cirrus sac, position ovary ootype and testes. (drawn from live specimen)

Fig. C. : Eggs enlarged.

## Allocredium isoporum Looss 1894

(Plate No. 5)

| | | |
|---|---|---|
| Host | : | Rita rita (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 300 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 2 |

### Discription

Body elongated, smooth, rounded both ends of body, oral sucker subterminal, rounded or spherical, ventral sucker just pre-equatorial, rounded or spherical, intracaecal, preovarion. prepharynx absent. Pharynx muscular rounded. Oesophagus long tubular. Intestinal caeca terminating near posterior end of body. Testes oval or rounded oblequily tandem, post equatorial, more or less equal, cirrus sac elongated. Anterior to ventral sucker, upto intestinal bifurcation. Vesicula seminalis sac like, elongated, bipartite, pars prostatica small, surrounded with numerous prostate gland cells. Ejaculatory duct narrow tubular.

Ovary oval or spherical, large, just post ventral sucker, equatorial. Receptaculum seminis post-ovarian. Vitelline follicales extending on intestinal bifurcation upto posterior end of body. Uterus arise from ootype extending upto posterior testis, then turns anteriorly and opens at genital pore. Egg large or few small, operculated. Genital pore interaceacal between intestinal ceaca and ventral sucker.

Excretory bladder simple, tubular, excretory pore terminal.

## MEASUREMENTS

Body length, 2.845 width, 0.740; oral sucker, 0.295 x 0.255; ventral sucker, 0.280 x 0.270; pre pharynx absent.; pharynx; 0.125 x 0.140; oesophagus, 0.235 x 0.02; anterior testis, 0.220 x 0.160; posterior testis, 0.225 x 0.170; cirrus sac, 0.380 x 0.080; vesicula seminalis, 0.135 x 0.060; pars prostatica, 0.055 x 0.150; ejaculatory duct, 0.145 x 0.010; ovary, 0.265 x 0.195; receptaculum seminis, 0.16 x 0.065; egg, 0.090 x 0.045.

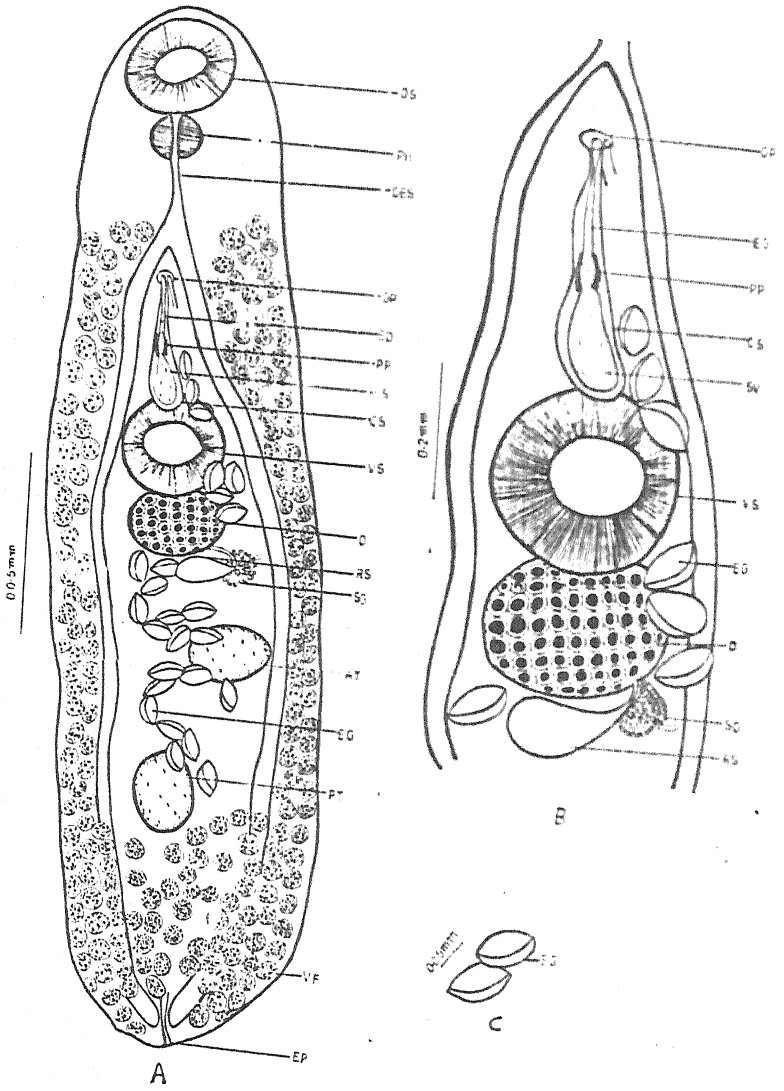
## Discussion

The present form is referred to genus Allocreadium Looss, 1900. It closely resembles with A. isoporum Looss, (1894)

Odhner 1901. But differs from it in the presence of oesophagus, in the position of testes, in the size and position of ovary, in the position of receptaculum seminis and in the extension of vetelline follicle.

These characters have been considered as individual variations.

# PLATE - 5



Allocredium isoporum Looss 1894

(Plate No. 5)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing position of cirrus sac, ovary, receptaculum seminis etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

## *Allocreadium nicolli* Pande, 1937

(Plate No. 6)

| | | |
|---|---|---|
| Host | : | *Rita rita* (Ham.) |
| Location | : | Intestine |
| Locality | : | Kanpur fish market |
| No. of fish examined | : | 300 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 8 |

### Discreption

Body elongated, smooth with narrow anterior and broad posterior ends. Oral sucker subterminal, spherical, or rounded. Ventral sucker spherical or rounded, smaller than oral sucker, pre-equatorial. Pre-pharynx absent. Pharynx small. oesophagus very short. Intestinal caeca terminating posterior end of body. Testes entire spherical, or oval, just post equatorial, intercaecal, tandem, more or less equal, anterior testis larger than posterior testis. Cirrus sac anterior to ventral sucker, elongated. Vesicula seminalis small, biparetite. Pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct small, narrow. Ovary oval, pre-equatorial or equatorial, left to

ventral sucker. Receptaculum seminis, pre-ovarian, vitellin follicales extending from posterior level of oral sucker, upto end of body. Uterus arises from ootype, intercaecal, extend upto middle of anterior testis than turns anteriorly and opens at genital pore. Egg oval, large, operculated. Genital pore intracaecal at anterior to ventral sucker or middle of ventral sucker or at the intestinal bifurcation.

Excretory bladder simple tubular; excretory pore terminal.

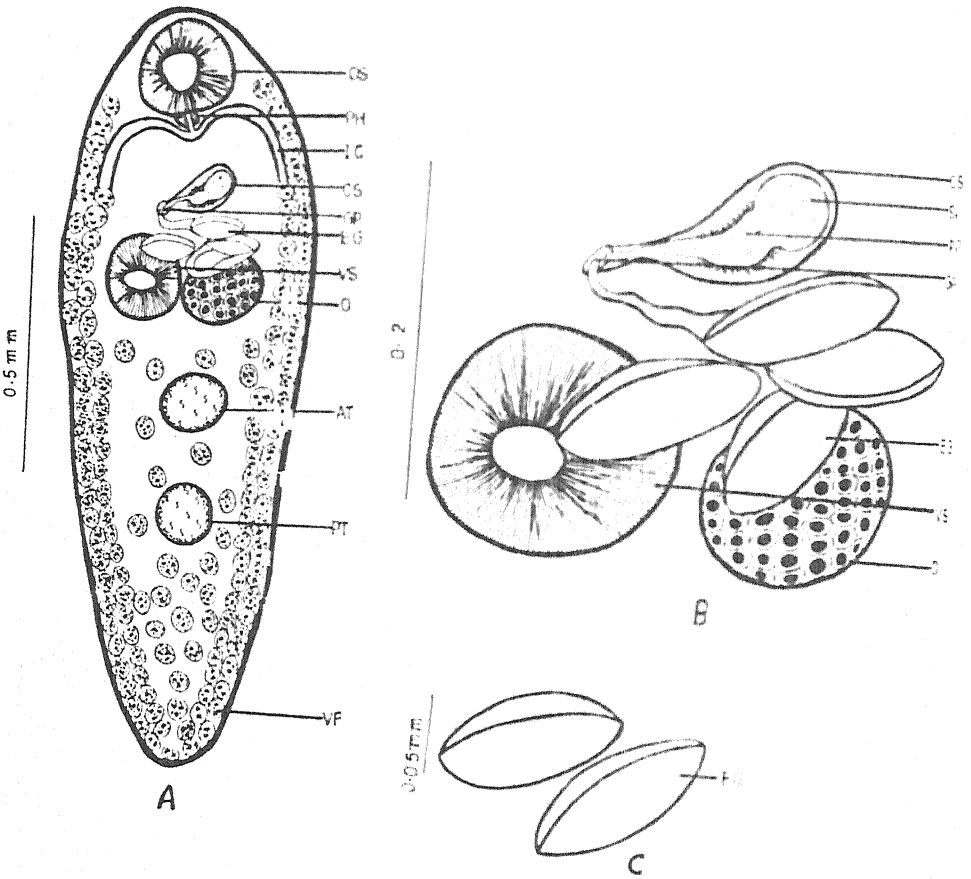
## Measurements

Body length, 1.485, width 0.480; oral sucker, 0.195 x 0.105; ventral sucker, 0.175 x 0.15; pre-pharynx absent; pharynx, 0.045 x 0.045; oesophagus 0.01 x 0.01; anterior testis, 0.135 x 0.115; posterior testis, 0.120 x 0.110; cirrus sac 0.170 x 0.07; vesicula seminalis, 0.06 x 0.045; pars prostatica, 0.045 x 0.025; ejaculatory duct, 0.055 x 0.010; ovary, 0.165 x 0.125; receptaculum seminis absent; egg 0.115 x 0.055.

## Discussion

The present form is referred to genus Allocreadium Looss, 1900. It closely resembles with A. nicolli Pande, 1937 but differs from absence of pre-pharynx, size of oesophagus, in the position of cirrus sac in the opening of genital pore, in the position of ovary and in the relative size of various organs. These characters have been considered as individual variations.

# PLATE - 6



## *Allocreadium nicolli* Pande 1937

(Plate No. 6)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, ovary, ventral sucker and eggs etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

## Allocreadium thaprai Gupta 1950

(Plate No. 7)

| | | |
|---|---|---|
| Host | : | Barbus sophor (Ham. & Day.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 200 |
| No. of fish infected | : | 7 |
| No.of specimen collected | : | 30 |

### Description

Body elongated, smooth, bluntely rounded anterior and slightly tappering posterior ends. Oral sucker subterminal, spherical or rounded. Ventral sucker spherical or rounded, pre-equatorial, muscular, smaller than the oral sucker. Pre-pharynx absent. Pharynx globular muscular. Oesophagus short tubular. Intestinal caeca reaching upto the posterior end of body. Testes post equatorial, tandem, spherical or rounded, interacaecal overlapping or separated, unequal, anterior testis smaller than the posterior testis. Cirrus sac saccular or slightly elongated, small, anterior to ventral sucker, vesicula seminalis small. Pars prostatica small surrounded by a large number of prostate gland cells. Ejaculatory duct

small. Ovary equatorial, pretesticular, post acetabular, rounded or oval or spherical. Receptaculum seminis, pouch like situated posterior to ovary. Well developed Laurer's canal, opens at ootype, near the receptaculum seminalis. Large number of shell gland surrounded the ootype. Uterus arises from ootype, extend upto posterior testis than turns anteriorly and opens at genital pore. Vitelline follicle large extending from posterior side of ovary upto posterior end of body. Two vitelline duct unite to form a vitelline reservoir. Open at ootype through a vitelline duct. Excretory bladder long tubular extending behind posterior end of body.

## Measurement

Body length, 2.940, width, 0.660, oral sucker, 0.255 x 0.255; ventral sucker, 0.210 x 0.200; pre-pharynx absent; pharynx, 0.11 x 0.13; oesophagus absent; anterior testis, 0.290 x 0.255; posterior testis, 0.330 x 0.320; cirrus sac, 0.260 x 0.075; vesicula seminalis 0.075 x 0.055; pars prostatica, 0.045 x 0.030; ejaculatory duct, 0.120 x 0.010; ovary, 0.175 x 0.165; receptaculum seminis, 0.22 x 0.085; egg 0.110 x 0.060.

## Discussion

The present form belongs to genus Allocreadium Looss, 1900. It closely resembles with A. thaprai Gupta, 1950 but differs from it in the position and opening of genital pore, in the position, size and shape of receptaculum seminis, in the extension of uterus, and in the relative size of various organs. These characters have been considered as individual variations. It is added as an additional host.

# PLATE - 7

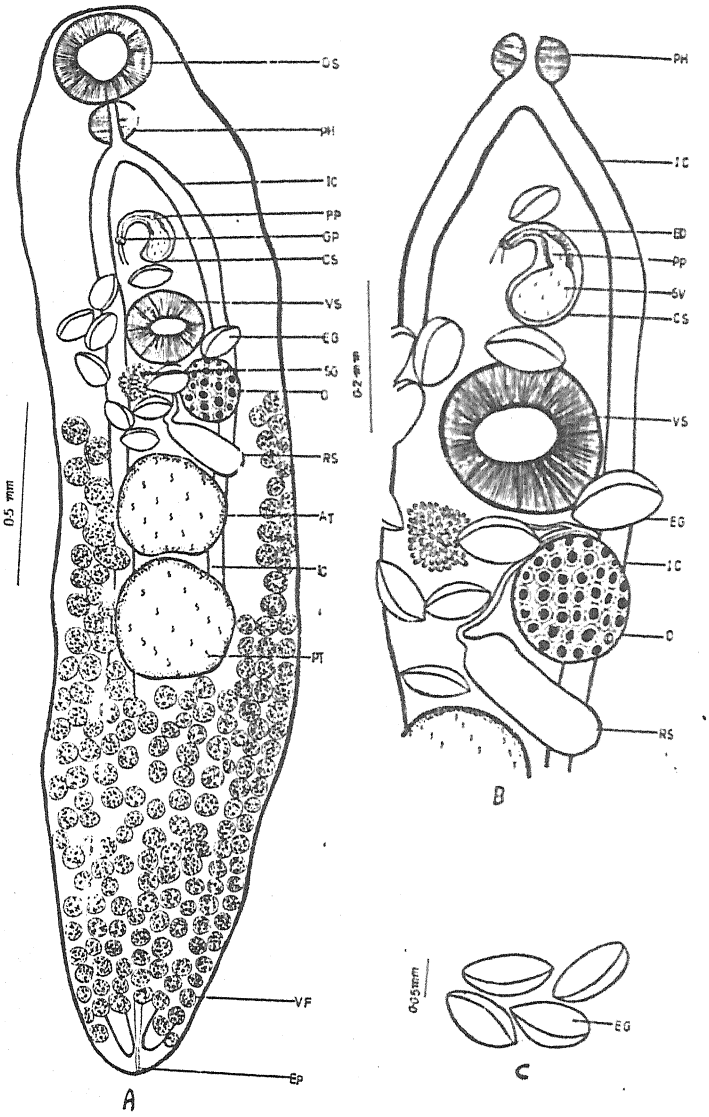



Fig. A.

Fig. B.

Fig. C.

Allocreadium thaprai Gupta 1950

(Plate No. 7)

Fig. A. Entire worm.

Fig. B. Posterior portion of body showing cirrus sac, position of receptaculum seminis and ovary etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

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## FAMILY : APOCREADIIDAE

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Apocreadium maxicanum Manter, 1937

(Plate No. 8)

| | | |
|---|---|---|
| Host | : | Barbus sarana (Ham. & Buch.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 2 |

## Description

Body elongated, smooth, tappering posterior and anterior ends. Oral sucker subterminal, subspherical. Ventral sucker oval, pre-equatorial, muscular. Prepharynx present. Pharynx rounded muscular. Oesophagus long tubular. Intestinal caeca reaching upto hind end of body. Testes tandem, post-equatorial, anterior testis smaller than posterior testis. Cirrus sac small, sac like. Vesicula seminalis claviform. Pars prostatica short, surrounded with neumerous prostate gland cells. Uterus extends up to posterior half of body and turns anteriorly, open through a metraterm at genital pore. Ovary equatorial. Posterior to the ventral sucker. Shell gland numerous surrounded the ootype, Laurer's canal present. Egg oval yellow operculated. Genital pore median and anterior to

ventral sucker. Vitelline follicles extend upto equatorial region to the posterior end of body. Two vitelline duct unite with each other to form a reservoir which opens at ootype. Excretory bladder S shaped, excretory pore terminal.

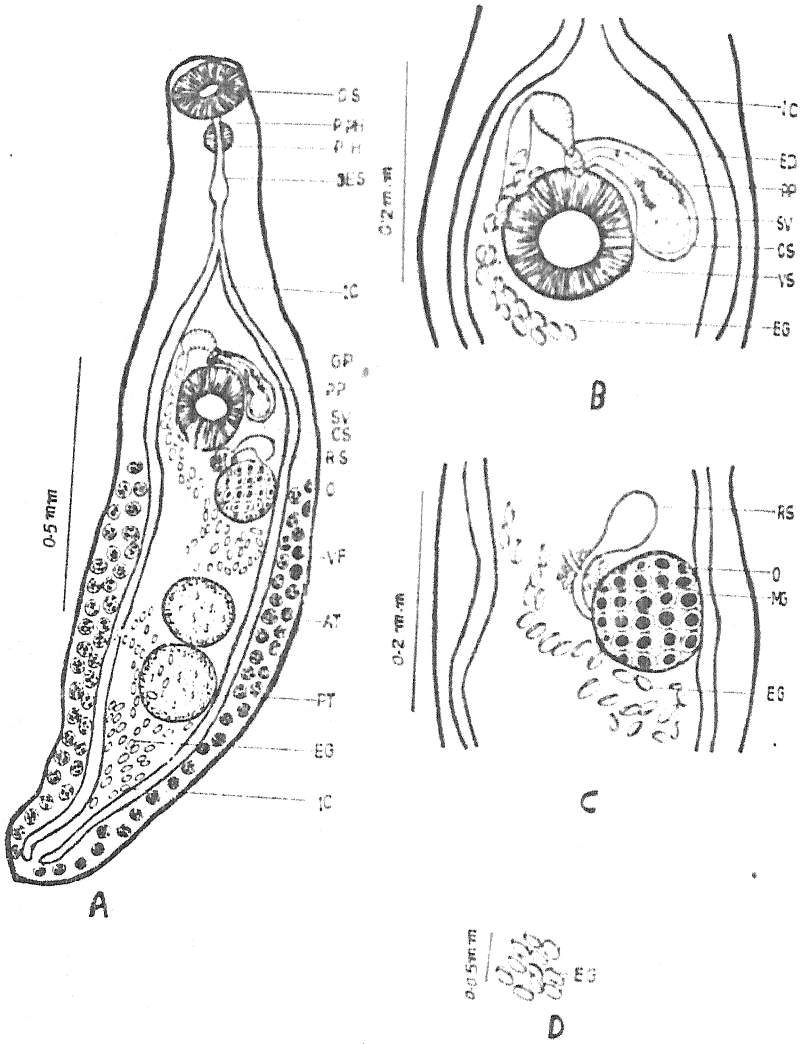
## Measurements

Body length, 1.735, width, 0.410; oral sucker, 0.145 x 0.100; ventral sucker, 0.165 x 0.125; pre-pharynx, 0.010 x 0.015; pharynx, 0.05 x 0.06; oesophagus, 0.185 x 0.020; anterior testis, 0.125 x 0.135; posterior testis, 0.145 x 0.145; cirrus sac, 0.185 x 0.040; vesicula seminalis, 0.045 x 0.040; pars prostatica, 0.045 x 0.020; ejaculatory duct 0.075 x 0.010, ovary, 0.125 x 0.115, receptaculum seminis 0.085 x 0.045; egg, 0.025 x 0.010.

## Discussion

The present form belongs to genus Apocreadium Manter, 1937. It closely resemble with A. maxicanum Manter, 1937. But differs from it in having long or short oesophagus, in the position of cirrus sac. In the position and shape of the testes and in the relative size of various organs. These characters are considered as individual variations.

# PLATE - 8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Apocreadium maxicanum Manter, 1937

(Plate No. 8)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing relative position of cirrus sac and ventral sucker etc. enlarged (drawn from live specimen).

Fig. C. Mid part of body showing position and shape of ovary and receptaculum seminis etc. enlarged (drawn from live specimen).

Fig. D. Eggs enlarged.

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FAMILY : BUCEPHALIDAE

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## Bucephalus kanpurensis n.sp.*

(Plate No. 9)

| | | |
|---|---|---|
| Host | : | Bagarius bagarius (Ham. & Skyes) |
| Location | : | Stomach |
| Locality | : | River Ganga Kanpur |
| No. of fish examined | : | 500 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 7 |

### Description

Body elongated, spinose. Oral sucker subterminal, oval, small with crown of eight tentacles. Ventral sucker absent. Pre-pharynx absent. Pharynx oval or rounded. Oesophagus long tubular. Intestine situated post testicularly, post-equatorial, elongated oval. Testes elongated oval, tandem or oblequli tandem, more or less equal, and post-equatorial. Cirrus sac small, elongated, extended from hind region of body topharynx. Vesicula seminalis oval, elongated. Short pars prostatica, surrounded with prostate gland cells and narrow

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* A full length paper on this genus and species has been communicated for publication in the "Journal of Scientific Research", Banaras Hindu University, Banaras.

ejaculatory duct. Ovary rounded, intertesticular, just post-equatorial. Receptaculum seminis absent, uterus extend up to two third of body length, leaving anterior one third of body and coils to open at genital pore through a short materaterm. Egg small oval, black, non operculated. Genital pore sub median, vitelline follicals pre-equatorial to equatorial, 6 to 8 in numbers. Excretory bladder tubular and extends up to uterus. Excretory pore sub-terminal.

## Measurements

Body length 2.470, width 0.265; oral sucker 0.110 x 0.085; ventralsucker and pre-pharynx absent, pharynx 0.050 x 0.050; oesophagus 0.20 x 0.02; arterior testes 0.225 x 0.105; posterior testis 0.215 x 0.085; cirrus sac 0.370 x 0.075; vesicula seminalis 0.095 x 0.055; pars prostatica 0.115 x 0.035; ejaculatory duct 0.110 x 0.010; ovary 0.090 x 0.080; receptaculum seminis absent; egg 0.010 x 0.005.

## Discussion

So for 18 species of the genus Bucephalus Baer, 1926 are reported from India viz., B. aoria Verma, 1936 from Aoria aoria; B. jagannathai Verma, 1936 from Cyrobium guttatum; B. tridentacularia Verma, 1936 from Aoria aoria and Mystus

seenghala; B. barina Srivastava, 1938 from Scatophagus argus; B. gangeticus Srivastva, 1938 from Pseudotropius athenoides and Mystus seenghala; B. indicus Srivastva, 1938 from Mystus seenghala; B. allahabadensis Srivastva, 1963 from Bagarius bagarius; B. bagarius Srivastva, 1963 from Bagarius bagarius;B. tritentacularis Srivastava, 1963 from Bagarius bagarius; B. octotentacularis Kakaji, 1969 from Wallagonia attu; B. elacatus Yadav, 1977 from Elacate nigra, B. bharatica and B. purshottami Kumar, 1979 from Bagarius bagarius and B. indica Agrawaland Agrawal, 1980 from Bagarius bagarius out of these, B. indicus has been considered synonym of B. tridentacularia by Srivastva (1963) but Kakaji (1969) retained B. indicus as a distinct species on the basis of the number of tentacles, anterior extent of cirrus sac, in the structure of rhynchus and in the relative size of various organs, A.K. Maurya and G.P. Agarwal (1992) Bucephalus gangai, B. vinodi Agrawaland Sachan earliar described from Bagarius bagarius. The present form differs from all the known species in the presence of long tubular oesophagus, shape of intestine except B. allahabadensis, in the shape and position of testes, in the position of ovary intertesticular; and in the number of vitelline follicals.

The present form closely related tothe B. gangaticus and B. elacatus in the extension and position of the intestine, in the shape and extension of cirrus sac, it also closer to B. indica, B. elacatus and B. aoria, in the number and shape of tentacles, but it differs from B. vinodi new species in which body is aspinose.

It is therefore, considered as new species and named B. kanpurensis n.sp.

The new species is named after the name of city from which host is collected.

# PLATE - 9

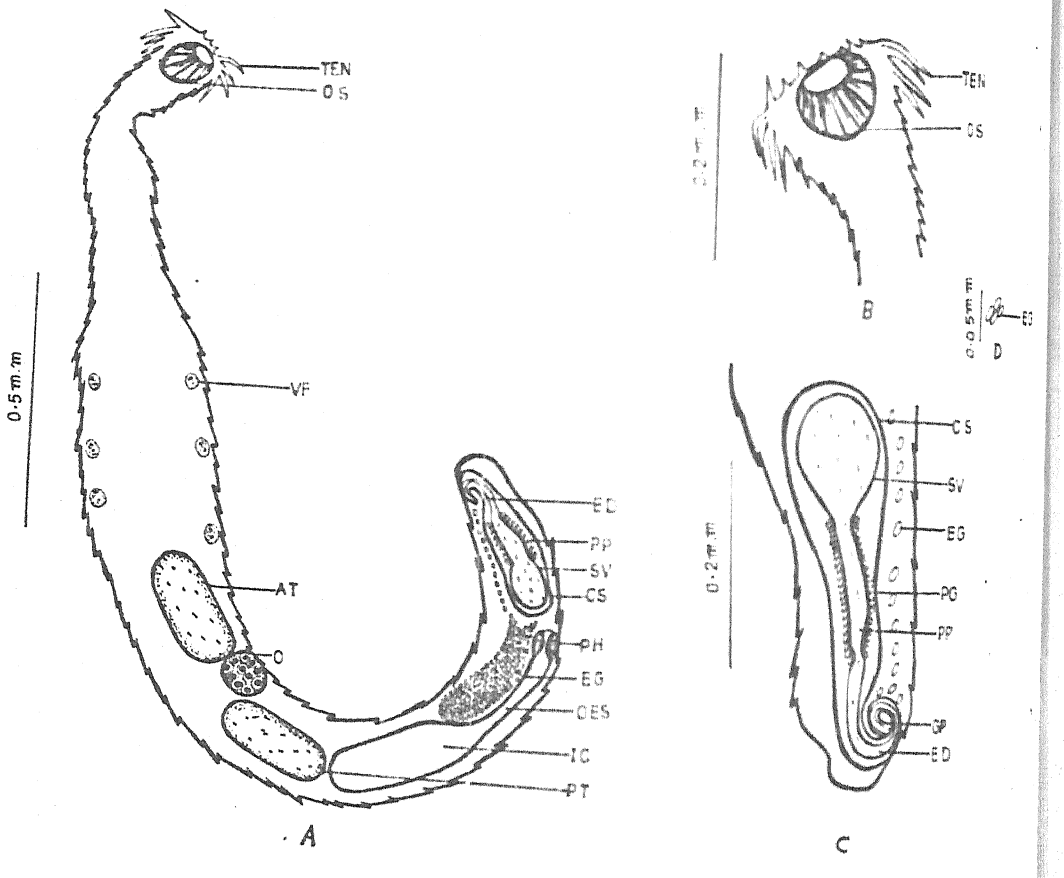


Fig.

Fig.

Fig.

Fig.

Bucephalus kanpurensis n.sp.*

(Plate No. 9)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing oral sucker, tentacles and spines enlarged (drawn from lie specimen).

Fig. C. Posterior part of body showing cirrus sac etc. (drawn from live specimen).

Fig. D. Egg enlarged.

## Bucephalus vinodi n.sp.*

(Plate No. 10)

| | | |
|---|---|---|
| Host | : | Bagarius bagarius (Ham. & Skyes.) |
| Location | : | Stomach |
| Locality | : | Ganga river Kanpur |
| No. of fish examined | : | 500 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 5 |

### Description

Body elongated, spinose. Oralsucker sub-terminal, rounded or oval, with a crown of two tentacles. Tentacles covered by minute spines. Ventral sucker absent. Pharynx ovalor rounded, leading in to sac like intestine through a small oesophagus. Intestine post-equatorial. Testes entire, oval tandem, more or less equal and placed one third of body length, reaching anteriorly just posterior to pharynx, parallel to anterior testis encloses vesicula seminalis, elongated, pars prostatica surrounded with prostate gland cells and narrow ejaculatory duct. Ovary oval or rounded, pre-testicular, post-equatorial.

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* A full length paper on this genus and species has been communicated for publication in the "Journal of Scientific Research", Banaras Hindu University, Banaras.N

Receptaculum seminis absent. Uterus extend up to anterior region of body, leaving anterior one third of body and coils to open at genital pore through a short metraterm. Egg small, oval yellow, non-operculated. Genital pore submedian. Vitelline follicles pre-equatorial to equatorial, 12 to 14 in number, on each side.

Excretory bladder tubular and extends up to uterus excretory pore subterminal.

## Measurements

Body length 1.090, width 0.260; oralsucker 0.125; ventralsucker absent; prepharynx absent; pharynx 0.04 x 0.045; oesophagus absent; anterior testis 0.115 x 0.065; posteror testis 0.120 x 0.060; cirrus sac 0.485 x 0.065; vesicula seminalis 0.070 x 0.045; pars prostatica 0.125 x 0.025; ejaculatory duct 0.160 x 0.030; ovary 0.105 x 0.085; receptaculum seminis absent; egg 0.020 x 0.010.

## Discussion

So far 17 species of the genus Bucephalus Bear, 1926 are reported from India viz., B. aoria Verma, 1936 from Aoria aoria; B. jagannathai Verma, 1936 from Cymbium guttatum; B. tridentacularia Verma, 1936 from Aoria aoria and Mystus seenghala; B. barina Srivastva, 1938 from Scatophagus argus;

B. gangaticus Srivastva, 1938 from Pseudotropicus athenoides and Mystus seenghala; B. indicus Srivastava, 1963 from Bagarius bagarius; B. bagarius Srivastva, 1963 from Bagarius bagarius; B. tritentacularis Srivastva, 1963 from Bagarius bagarius; B. octotentacularis Kakaji, 1969 from Wallagonia attu; B. elacatus Yadav, 1977 from Elacate nigra, B. bharatica and B. indica Agrawaland Agrawal, 1980 from Bagarius bagarius Maurya and Agrawal 1992 from Bucephalus gangai out of these, B. indicus has been considered synonym of B. tridentacularia by Srivastava (1963) but Kakaji (1969) retained.

B. indicus as a distinct species on the basis of the number of tentacles, anterior extent of cirrus sac, in the structure of rhynchus and in the relative size of various organs.

The present form differs all the known species in the presence of tentacles shape and number of tentacles, which are bifurcated at the tip, in the extension of vitelline follicals except in B. allahabadensis.

It is closer to B. allahabadensis, B. bagarius, B. tritentacularia, B. elacatus, but differs in the position of cirrus sac and in the position of testes.

It further differs from B. chillenc, B. allahabadensis,

in the shape of the intestine. It also differs from B. indicus, in the shape of the egg and from B. barina, B. bharatica in the shape and position of cirrus sac.

Therefore, a new species Bucephalus vinodi n.sp. is erected for its reception.

The new species is named in the honour of prominent helminthologist Dr. Smt. V. Gupta, Professor of Zoology, Lucknow University, Lucknow.

# PLATE - 10

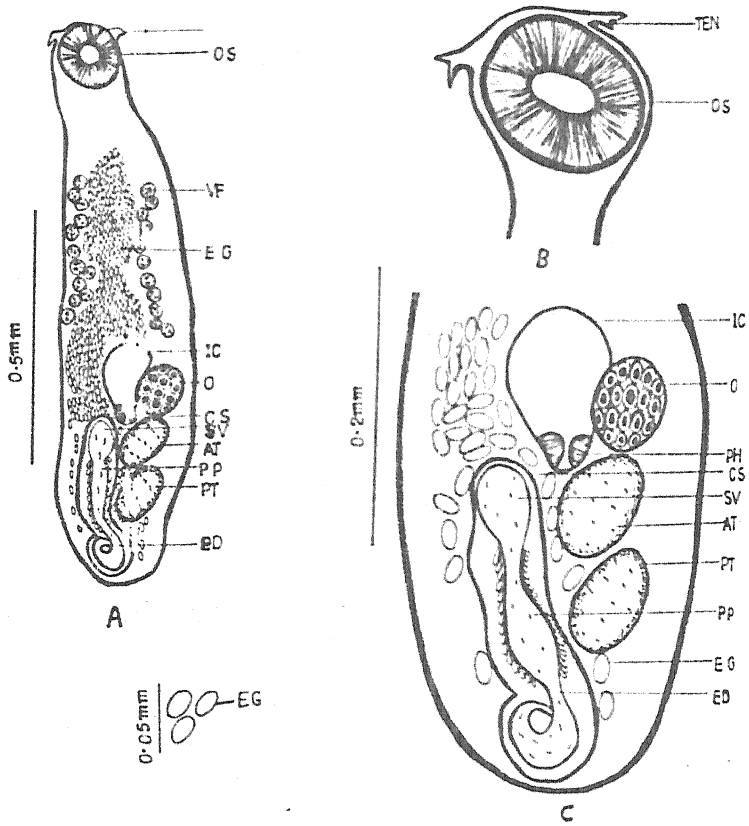



Fig. A.

Fig. B.

Fig. C.

Fig. D.

Bucephalus vinodi*

(Plate No. 10)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing 2 tentacle.

Fig. C. Posterior part of body showing cirrus sac, ovary, testis and other parts of body etc. enlarged (drawn from live specimen).

Fig. D. Egg enlarged.

## Prosorhynchoides garvai Verma, 1936

(Plate No. 11)

| | | |
|---|---|---|
| Host | : | Barbus sophor (Ham. & Day.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 200 |
| No. of fish infected | : | 5 |
| No.of specimen collected | : | 35 |

### Description

Body fusiform sub cylindrical, spinose or smooth, rounded anterior and tappering posterior ends. Oral sucker subterminal oval, rhyncus with out tentacular appendages, muscular, mouth placed mid ventrally. Ventral sucker absent. Pharynx muscular, rounded. Oesophagus long tubular or short, narrow. Intestine sac like, elongated; median, equatorial. Testes tandem, symmetrical, left testis elongated, larger than right testis. Cirrus sac straight or curved or sickle shaped, extend up to the oesophagial region to hind end of body, encloses a rounded or oval vesicula seminalis. Elongated, pars prostatica, surrounded with prostate gland cells and long curved ejaculatory duct. Ovary rounded, pretesticular, pre-

equatorial. Receptaculum seminis oval or sac like, post-testicular. Uterus arises from ootype extends anteriorly upto posterior margin of oral sucker and comes down in between the two testes, thus forming a loop on one side and travels to other side, to form a convoluted loop and finally travels to posterior part of body, open in to genital pore. Eggs small oval, yellow. Genital pore posteriorly placed. Vitelline follicles anteriorly placed, in between oral sucker and ovary. Two vitelline duct unite, to form a yolk reservoir and opens at ootype by a common vitelline duct. Excretory vesicle variable in length, elongated sac like extend up to posterior testis.

## Measurements

Body length 0.745, width 0.425, oral sucker 0.185 x 0.125; ventral sucker absent. Pre-pharynx absent; pharynx 0.06 x 0.08; oesophagus 0.06 x 0.035; anterior testis 0.135 x 0.120; posterior testis 0.185 x 0.085; cirrus sac, 0.430 x 0.080; vesicula seminalis 0.065 x 0.040; Pars Prostatica, 0.145 x 0.020; ejaculatory duct 0.220 x 0.020; ovary, 0.095 x 0.090; receptaculum seminis, 0.085 x 0.04; egg 0.020 x 0.010.

## Discussion

The name Bucephaloides has been treated as a synonym of Prosorhynchoides by Srivastva and Chauhan (1972). The species included under the Bucephloides have been transferred under the genus Prosorhynchoides Dollfus, 1929 with P. ovatus, genotype. Prosorhynchoides garuai (Verma, 1936) differs from the original account of Verma (1936), in the position of various organs. The specimen obtained slightly differs from P. garuai, in the presence of spines half region of body. Testes tandem symmetrical, digonal, unequal, situated left and right side, long tubular oesophagus, in the position of ovary. Receptaculum seminis sac like, small, Laurer's canal present. These features appears to be individual variation.

# PLATE - 11

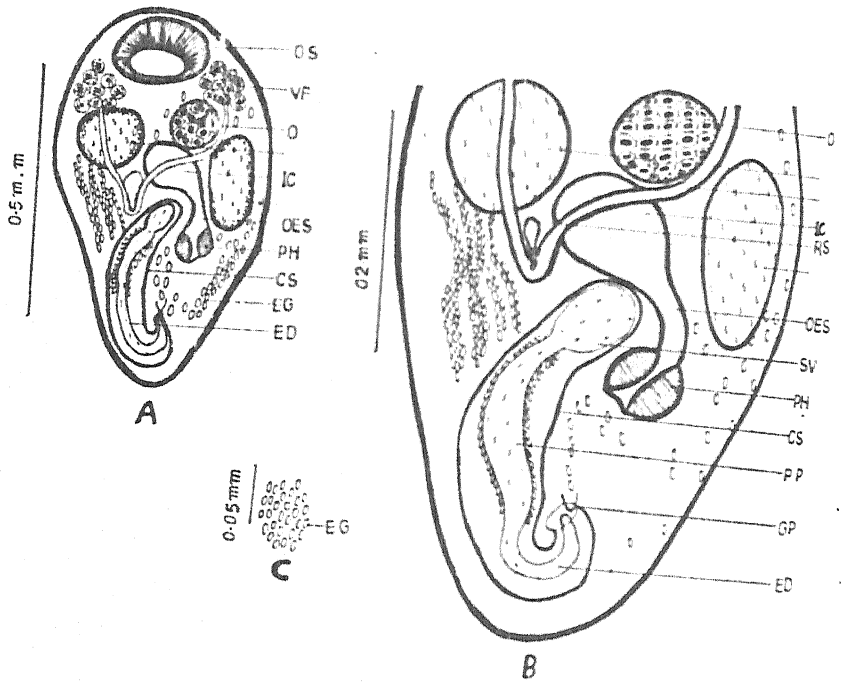



Fig. A.

Fig. B.

Fig. C.

Prosorhynchoides garvai Verma, 1936

(Plate NO. 11)

Fig. A. Entire worm.

Fig. B. Part of body showing variations and position of cirrus sac, vitelline follicles and etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

## Prosorhynchoides karvei Bholerao, 1937

(Plate No. 12)

| | | |
|---|---|---|
| Host | : | Barbus sophor (Ham. & Day.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 200 |
| No. of fish infected | : | 3 |
| No.of specimen collected | : | 8 |

### Description

Body spinose, sub cylindrical, rounded anterior and tappering posterior ends. Oral sucker subterminal oval or spherical. Ventral sucker absent. Prepharynx absent. Pharynx globular, muscular. Oesophagus absent. Intestine saccular. Testes entire, tandem or oblequily tandem, oval or spherical, unequal, anterior testis equatorial, elongated, posterior testis spherical, smaller than the anterior testis, post equatorial. Cirrus sac long extend upto middle of stomach. Vesicula seminalis small, oval, pars prostatica long, tubular, surrounded by a large number of prostate gland cells. Ejaculatory duct small. Ovary oval or rounded, pre-equatorial. Receptaculum seminis small posterior to the ovary. Uterus

arises from ootype, and opens at genital pore. Eggs small, numerous, non-operculated. Genital pore subterminal at the posterior end of body. Vitelline follicle pre-equatorial, extending between oral sucker and the anterior end of ovary. Number of vitelline follicals 12 to 16 on each side of body. Vitelline duct arises from both side, united near receptaculum seminis and opens in it.

## Measurement

Body length, 0.89, width, 0.365; oral sucker, 0.195 x 0.125, ventral sucker absent, pre-pharynx absent, pharynx, 0.05 x 0.045, oesophagus absent; anterior testis 0.145 x 0.065; posterior testis, 0.120 x 0.085, cirrus sac, 0.545 x 0.065, vesicula seminalis, 0.095 x 0.045; pars prostatica, 0.195 x 0.035; ejaculatory duct, 0.225 x 0.02, ovary 0.085 x 0.070; receptaculum seminis 0.05 x 0.03; egg 0.015 x 0.010.

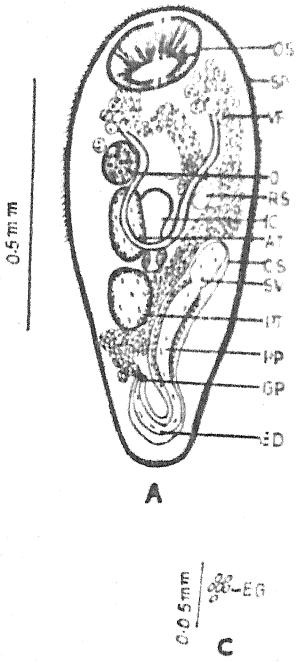
## Discussion

The name Bucephaloides has been treated as synonym of Prosorehenchoides by Srivastava and Chauhan (1972) and the species included under Bucephaloides have been transferred under the genus Prosorhenchoides dollfus, 1929 with P. ovatum

genotype.

This is the first record of Prosorhynchoides karvei Bholerao, 1937 from Kanpur region. The specimen obtained slightly differs from P. karvei. In the presence of spines, in the body, upto cirrus sac region, in the absence of oesophagus, in the shape of seminal vesicle, shape and size of anterior testis, these features appears to be individual variations.

# PLATE - 12



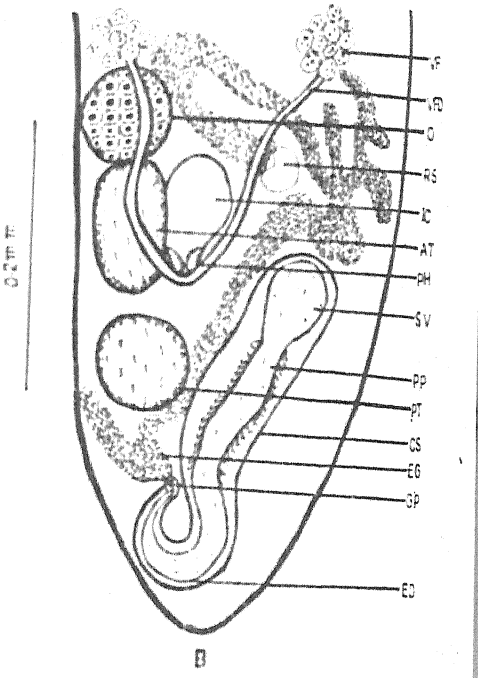







Fig.

Fig.

Fig.

Prosorhynchoides karvai Bholerao, 1937

(Plate No. 12)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, vitelline follicles and testes etc. (drawn from live specimen)

Fig. C. Egg enlarged.

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FAMILY : DICROCOELIIDAE

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## *Neodicrocoelium nirupmai* n.sp.*

(Plate No. 13)

| | | |
|---|---|---|
| Host | : | *Mystus vitattus* (Cuv. & Bloch.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 8 |

### Description

Body elongated, spinose, rounded anterior and slightly tappering posterior end. Oral sucker subterminal, oval or rounded. Ventral sucker equatorial, spherical or rounded. Pre-pharynx small, pharynx muscular, rounded. Oesophagus long tubular. Intestinal caeca reaching up to the posterior end of body. Testes just post equatorial, parallel, small, unequal oval, left testis larger than right testis. Cirrus sac small, sac like, between the ventral sucker and intestinal bifurcation. Vesicula seminalis small, anterior to ventral sucker. Pars-prostatica small surrounded by numerous prostate

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* A full length paper on this species has been accepted for publication in the journal "Indian Journal of Helminthology".

gland cells, ejaculatory duct short narrow. Genital pore just post bifurcal, between ventral sucker and intestinal bifurcation. Ovary median, spherical, rounded or oval, post testicular, just post-equatorial. Receptaculum seminis, pre-ovarian small, sac like. Shell gland numerous surrounded the ootype, Laurer's canal not visible. Vitelline follicles small extending from anterior end of body up to posterior end of body, intra and extra coecal, slightly thinner at intracoecal, equatorial region. Uterus arising from ootype up to genital pore, occupying whole of body. Eggs small numerous unembryonated. Excretory bladder simple tubular reaching up to ovary, excretory pore terminal.

Measurements

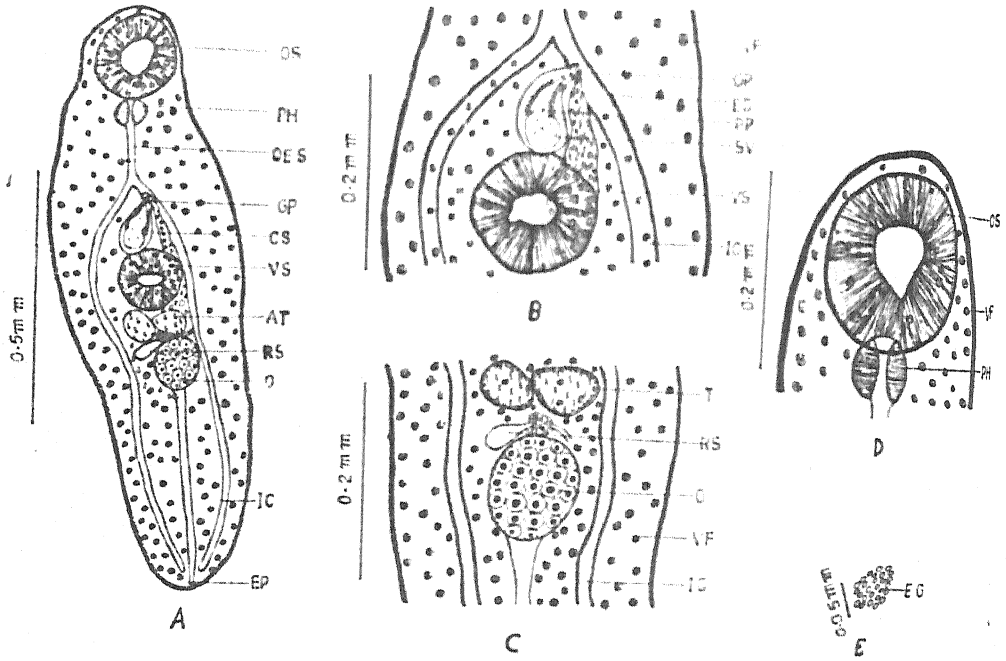
Body length 1.145, width 0.355; oral sucker 0.175 x 0.150; ventral sucker 0.120 x 0.120; pre-pharynx absent; pharynx 0.05 x 0.06; oesophagus, 0.09 x 0.015; anterior testis 0.065 x 0.050; posterior testis 0.060 x 0.045; cirrus sac 0.120 x 0.060; vesicula seminalis, 0.035 x 0.040; pars prostatica, 0.050 x 0.025; ejaculatory duct, 0.025 x 0.005; ovary 0.110 x 0.085; receptaculum seminis, 0.06 x 0.025; eggs 0.010 x 0.005.

## Discussion

The present form belongs to genus Neodicrocoelium Agrawal and Sharma, 1989 and it differs from the known species N. gayaprsadai, in the presences of spines on the oral sucker, in the presence of pre-pharynx, by having long tubular oesophagus. Testes are parallel and pairing to each other and vitelline follicles extending from anterior to posterior ends. It is therefore, regarded as a new species.

The new species is named N. nirupmai in the honour of great helminthologist Dr. Nirupma Agrawal, Senior Reader in the Department of Zoology, Lucknow University, Lucknow.

# PLATE - 13




Fig

Fig

Fig

Fig

Fig

PLATE

Neodicrocoelium nirupmai n.sp.*

(Plate No. 13)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac (drawn from live specimen).

Fig. C. Mid part of body showing ovary testis, Receptaculum seminis, etc. enlarged (drawn from live specimen).

Fig. D. Anterior part of body showing oral sucker and extention of vitelline follicles (drawn from live specimen).

Fig. E. Egg enlarged.

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## FAMILY : HEMIURIDAE

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## Macradenina mestacembeli n.sp.*

(Plate No. 14)

| | | |
|---|---|---|
| Host | : | Mestacembelus armetus (Lac.) |
| Location | : | Stomach |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 500 |
| No. of fish infected | : | 3 |
| No.of specimen collected | : | 10 |

### Description

Body elongated, smooth, rounded both ends of body. Oral sucker rounded or spherical, terminal or sub terminal. Ventral sucker rounded or spherical, pre-equatorial to equatorial larger than the oral sucker. Pre-pharynx present. Pharynx oval, or rounded, muscular. Oesophagus absent. Intestinal caeca extending to posterior extremity. Testes smaller parellel or tandem, just post equatorial. Cirrus sac median, situated in between intestinal bifurcation and ventralsucker. Vesicula seminalis tubular winding pars prostatica. Ejaculatory duct long tubular. Genital pore about mid way

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* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology.

between two suckers. Ovary entire just post equatorial. Just posterior to ventral sucker intertesticular. Receptaculum seminis large post-ovarian. Vitelline follicles composed, claviform, post ovarian. Uterus extending pre-equatorial and anterior to ventralsucker. Egg small, operculated yellow or black. Excretory vesicles present.

## Measurements

Body length 0.915, width 0.240; oral sucker 0.085 x 0.075; ventralsucker 0.195 x 0.190; pre-pharynx 0.02 x 0.01; pharynx 0.045 x 0.045; oesophagus absent; anterior testis 0.040 x 0.035; posterior testis 0.040 x 0.040; cirrus sac 0.155 x 0.045; vesicula seminalis 0.025 x 0.010; pars prostatica 0.040 x 0.015; ejaculatory duct 0.160 x 0.010; ovary 0.065 x 0.060; receptaculum seminis 0.08 x 0.02; egg 0.040 x 0.020.

## Discussion

The present form belongs to the genus Macradenina Manter, 1947 with type species M. acanthuri from Accanthurus caeruleus. It differs from it in the presence of pre-pharynx, in the absence of oesophagus, position and size of ventral sucker in the position and size of testes, in the shape and position of ovary and in the extension of uterus. It is

therefore, regarded as a new species Macrodenina mestacembeli n.sp.

The new species is name after the name of host from which the parasite is collected.

# PLATE - 14

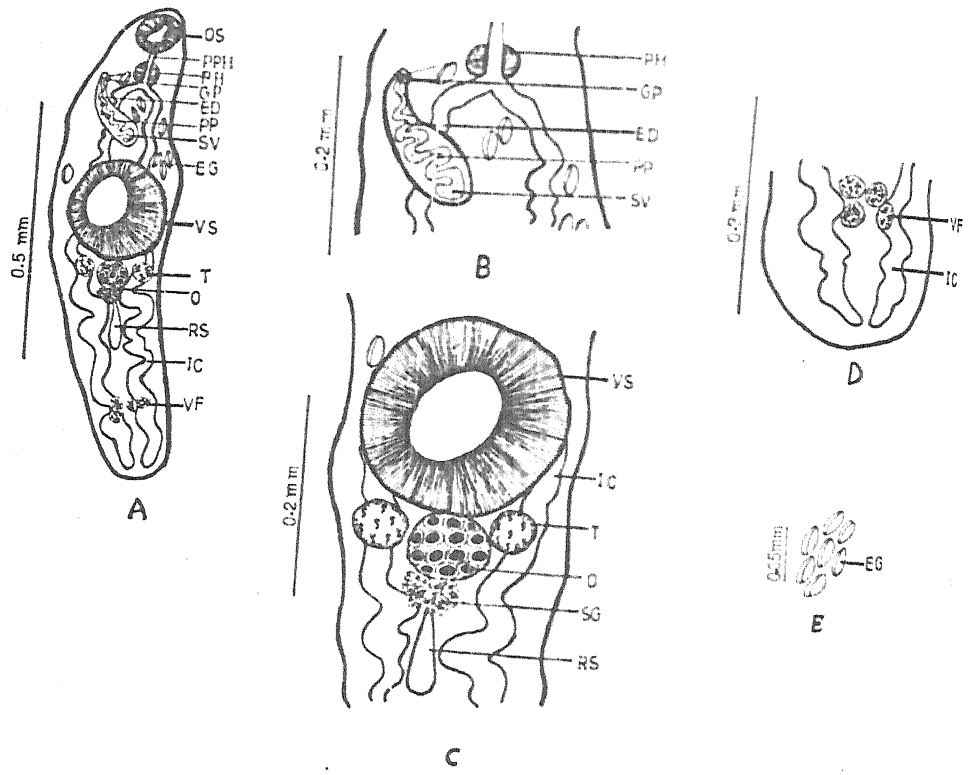


Fig. A

Fig. B

Fig. C

Fig. D

Fig. E

Macradenina mestacembelai n.sp.*

(Plate No. 14)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing position of cirrus sac.

Fig. C. Mid part of body showing Testes, Ovary and Receptaculum seminal etc. enlarged (drawn from live specimen).

Fig. D. Posterior part of body showing vitelline follicles (drawn from live specmen showing variations).

Fig. E. Egg enlarged.

## Macradenina thapraii n.sp.*

(Plate No. 15)

| | | |
|---|---|---|
| Host | : | Mestacembelus armetus (Lac.) |
| Location | : | Stomach |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 500 |
| No. of fish infected | : | 3 |
| No.of specimen collected | : | 7 |

### Description

Body elongated, smooth, rounded anterior and tappering posterior end. Oralsucker subterminal, rounded, or spherical. Ventral sucker very large extended from pre-equatorial to post-equatorial region of the body, rounded or spherical larger than the oral sucker. Pre-pharynx absent. Pharynx muscular globular. Oesophagus absent. Intestinal caeca extending toposterior extremity. Testes oval or rounded, post-equatorial, parellel, more or less equal. Cirrus sac pre-ovarian, small, extend upto the intestinal bifurcation. vesicula seminalis sac-like small pars prostatica. Ejaculatory

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* A full length paper on this genus and species has been communicated for publication in the "Journal of Scientific Research", Banaras Hindu University, Banaras.

duct long tubular. Genital pore just post pharyngeal, at the caecal bifurcation. Ovary oval or rounded. Pre-equatorial, anterior to the ventralsucker. Receptaculum seminis small, sac-like, post-ovarian, anterior to ventralsucker. Vitelline follicles composed claviform, post-testicular at the hind end of body. Uterus arises at the intestinal bifurcation and anterior to ventral sucker. Eggs small, operculated, yellow black. Excretory vesicles present.

## Measurements

Body length 1.850, width 0.750; oral sucker 0.30 x 0.240; ventral sucker 0.740 x 0.655; pre-pharynx 0.005 x 0.020; pharynx 0.055 x 0.080; oesophagus absent; anterior testis 0.140 x 0.095; posterior testis 0.105 x 0.100; cirrus sac 0.140 x 0.050; vesicula seminalis 0.035 x 0.030; pars prostatica 0.035 x 0.005; ejaculatory duct 0.125 x 0.010; ovary 0.150 x 0.085; receptaculum seminis 0.085 x 0.030; egg 0.020 x 0.010.

## Discussion

The present form belongs to the genus Macradenina Manter, 1947. As for as the writer is aware so for only twospecies have been described. M. acanthuri Manter, 1947 from Acanthurus

caruleus and M. mestacembeli Agrawal and Sachan, 1993 from Mestacembelus armetus. The present form differs from all the known species, in the absence of pre-pharynx and oesophagus, in the position, shape and size of testes. In the extension and position of cirrus sac, opening of genital pore, in the position and shape of ovary, inthe position and size of receptaculum seminis. In the number of vitelline follicles, it is therefore, regarded as a new species M. thapraii n.sp.

The new species is named in the honour of Late Professor Dr. G.S. Thapar. He is great reputed helminthologist of India.

# PLATE - 15

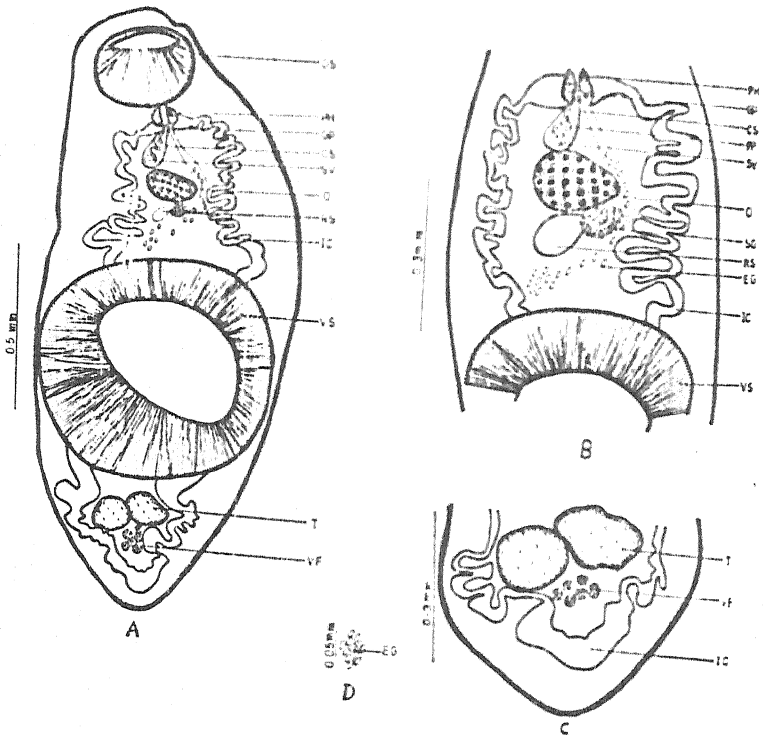


Fig. A.

Fig. B.

Fig. C.

Fig. D.

Macradenina thapraii n.sp.*

(Plate No. 15)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac, positionof ovary and receptaculum seminis etc.enlarged (drawn from live specimen).

Fig. C. Posterior part of body showing position of testes, vitelline follicles, etc. enlarged (drawn from live specimen).

Fig. D. Egg enlarged.

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FAMILY : MONARCHIDAE

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## *Ancylocoelium ritai* n.sp.*

(Plate No. 16)

| | | |
|---|---|---|
| Host | : | *Rita rita* (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 300 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 15 |

### Description

Body elongated,smooth, tappering anterior and rounded posterior ends. Oral sucker terminal, rounded. Ventralsucker, pre-equatorial, or equatorial, oval or rounded or muscular, post bifurcal, pre-pharynx long tubular, pharynx rounded muscular. Oesophagus thick tubular small. Intestine V shaped with two limbs terminating a little behind level of intestinal bifurcation. Testes tandem oval and rounded post-equatorial, anterior testis larger than the posterior testes, cirrus sac elongated, pouch like, behind right caecum, containing large seminalvesicle and short pars prostatica, surrounded by

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* A full length paper on this species has been accepted for publication in the journal "Indian Journal of Helminthology.

numerous prosted gland cells. Genital pore median, post bifurcal. Ovary just posterior to ventralsucker, rounded or oval, vitelline follicles tubular extend up to equatorial region to hind end of body. Receptaculum seminis post-ovarian, sac like, equatorial. Uterus extremely voluminous, not convoluted, extending posterior end of body to genital pore. Eggs small yellow black, operculated. Excretory vesicles tubular.

## Measurements

Body length 2.28, width 0.40; oral sucker 0.185 x 0.155; ventral sucker 0.235 x 0.165; pre-pharynx 0.13 x 0.025; pharynx 0.09 x 0.095; oesophagus absent; anterior testis 0.125 x 0.135; posterior testis 0.140 x 0.085; cirrus sac 0.270 x 0.060; vesicula seminalis 0.095 x 0.060; pars prostatica 0.075 x 0.020; ejaculatory duct 0.110 x 0.010; ovary 0.135 x 0.010; receptaculum seminis 0.11 x 0.06; egg 0.025 x 0.015.

## Discussion

The present form belongs to genus Ancylocoelium Nicoll 1912 so far only one species A. typicum is known. The present form differs from it by having smooth body, pre-pharynx long tabular, pharynx prominent muscular. Oesophagus short, thick intestinal caeca, V shaped, extend in pre-equatorial region or

above the ventral sucker. In the position of ovary which is closer to posterior end of ventralsucker in having receptaculum seminis between ovary and anterior testis.

In the view of these differences the present form is considered as a new species with a specific name A. ritai.

The name of species is given after the name of host from which it was collected.

# PLATE - 16

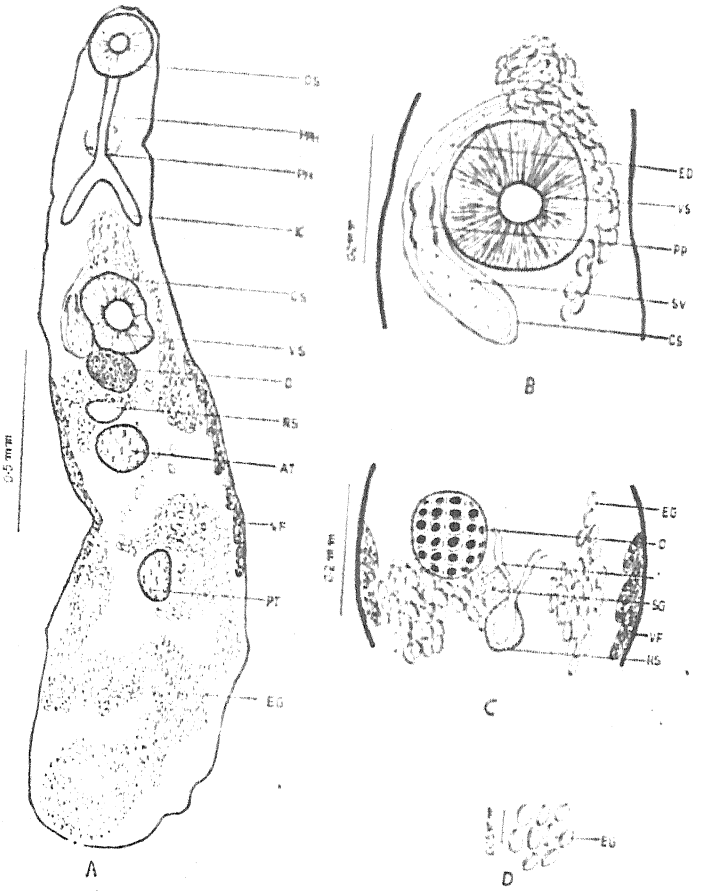


Fig. A

Fig. B

Fig. C

Fig. D

Ancylocoelium ritai n.sp.*

(Plate No. 16)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac etc. enlarged (drawn from live specimen).

Fig. C. Mid part of body showing position and shape of ovary, receptaculum seminalis, vitelline follicles.

Fig. D. Egg enlarged.

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FAMILY : OPISTHORCHIIDAE

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## Ophisthorchis pedicellata Verma, 1927

(Plate No. 17)

| | | |
|---|---|---|
| Host | : | Bagarius bagarius (Ham. & Skyes) |
| Location | : | Gall bladder |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 500 |
| No. of fish infected | : | 10 |
| No.of specimen collected | : | 32 |

### Description

Body elongated, spinose, slender with narrower anterior and tappering posterior ends. Oral sucker oval or rounded. Ventral sucker equatorial, spherical or rounded and larger than oral sucker. Pre-pharynx very small, visible in living specimen. Pharynx globular oval and muscular. Oesophagus short. Intestinal caeca reaching up to hind end of posterior testis. Testes lobed tandem located in posterior region of the body and more or less equal. Cirrus sac posterior to ventral sucker, post equatorial, vesicula seminalis, thin walled, long tubular extend up to posterior end of ventral sucker and middle region of the body. Ovary pretesticular, pear shaped, oval or rounded. Receptaculum seminis sac like post-ovarian, pre testicular on left side, uterus intercaecal, coils

horizontally placed extending in between ventral sucker and ovary, and opens at genital pore by metraterm. Shell glands numerous and surrounded. The ootype. Laurer's canal present. Egg oval small yellow, black, operculated. Genital pore median, pre-acetabular. Vitelline follicles extend from little posterior to ventral sucker up to middle of ovary. Two vitelline duct unite with each other to form a yolk reservoir, which opens at ootype. Excretory bldder 'S' shaped, excretory pore terminal.

## Measurements

Body length 2.325, width 0.220; oral sucker 0.095 x 0.095; ventral sucker 0.185 x 0.150; pre-pharynx 0.02 x 0.01; pharynx 0.045 x 0.05; oesophagus absent; anterior testis 0.275 x 0.080; posterior testis 0.180 x 0.085; cirrus sac 0.555 x 0.020; vesicula seminalis, pars prostatica and ejaculatory duct non vesicle. Ovary 0.090 x 0.070; receptaculum seminis 0.09 x 0.94; egg 0.020 x 0.010.

## Discussion

The present form belongs to Opisthorchis pedicellata Verma 1927 and is recorded for the first time from Kanpur region earlier, Verma (1927) described, this species fromthe

gall bladder of Bagarius bagarius, at Allahabad. Further more this parasite has been also redescribed by Kumar (1979) from Bagarius bagarius at Varanasi, and this parasite also redescribed by Agrawal and Agrawal (1980) from Bagarius bagarius at Bundelkhand Jhansi region. However, it differs from the original account of Verma (1927) in the ratio of suckers, position of oral sucker which is terminal in the presence of prepharynx, oesophagus is very short or absent. Extension of vesicula seminalis from post-equatorial of body up to just above the anterior end of ventral sucker. These differences appears to be individual variation.

# PLATE - 17

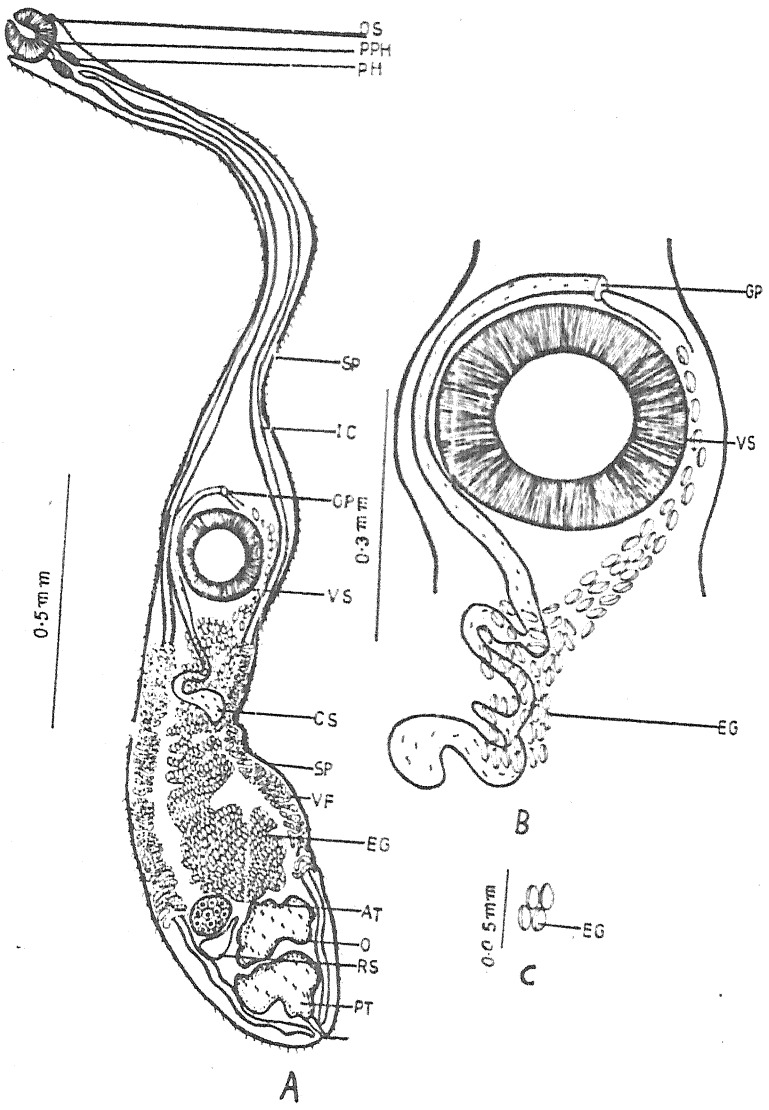


Fig. A.

Fig. B.

Fig. C.

Ophisthorchis pedicellata Verma 1927

(Plate No. 17)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, ventral sucker etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

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FAMILY : OPISTHOLBETUDAE

---

Pycnadena pokhrayansis n.sp.

(Plate No. 18)

| | | |
|---|---|---|
| Host | : | Mystus vitattus (Cuv. & Bloch.) |
| Location | : | Intestine |
| Locality | : | Fish market Pokhrayan |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 35 |

## Description

Body elongated, smooth, rounded anterior and tappering posterior ends. Oral sucker subterminal, spherical or rounded. Ventral sucker pre-equatorial, oval or spherical, large or equal than oral sucker. Pre-pharynx absent. Pharynx globular, muscular. Oesophagus absent. Intestinal caeca terminating at posterior end of body. Testes entire oval or rounded, parallel, very much closing to each other, just posterior to ventralsucker, more or less equal. Cirrus sac saccular anterior to ventralsucker below intestinal bifurcation. Vesicula seminalis small, pars prostatica small surrounded by large number of prostate gland cells. Ejaculatory duct narrow small. Ovary oval or oblong, anterior toventral sucker, pre-equatorial. Receptaculum seminis, post-ovarian. Vitelline

follicles small or large extending from posterior region of ventral sucker up to hind end of body. Uterus arises from ootype, extending up to posterior testis then turns anteriorly and opens at genital pore. Eggs oval, large, operculated. Genital pore post bifurcal. Excretory bladder tubular, excretory pore terminal.

## Measurements

Body length 1.625, width 0.485; oral sucker 0.195 x 0.195; ventral sucker 0.21 x 0.14; pre-pharynx absent; pharynx 0.06 x 0.08; oesophagus absent. Anterior testis 0.125 x 0.105; posterior testis 0.135 x 0.105; cirrus sac 0.115 x 0.06; vesicula seminalis 0.045 x 0.040; pars prostatica 0.015 x 0.010; ejaculatory duct 0.035 x 0.040; ovary 0.09 x 0.08; receptaculum seminis absent. Egg 0.07 x 0.035.

## Discussion

The present form belongs to genus Pycnadena Linton 1911. So far eight species of this genus viz. P. lata Linton, 1910) Linton, 1911, P. pyriformae Price, 1934, P. komiyai Srivastava, 1962, P. africana Fischthal and William, 1971, P. cheilodactyli Evdokimove, 1971. P. bariliusi Kumari & Srivastava, 1975 have been reported from entire world. P.

betwai Agrawaland Sharma 1989 and P. indica Agrawaland Sharma, 1989. It differs from all the known speies in the position of testes which is equatorial, post-acetabular, more or less parallel to each other, in the position of ovary which is pre-acetabular, pre-equatorial and in the size of eggs.

Therefore, a new species P. pokhrayansis n.sp. is formed for its reception.New species is named after the name of the place from which the host is collected.

# PLATE - 18

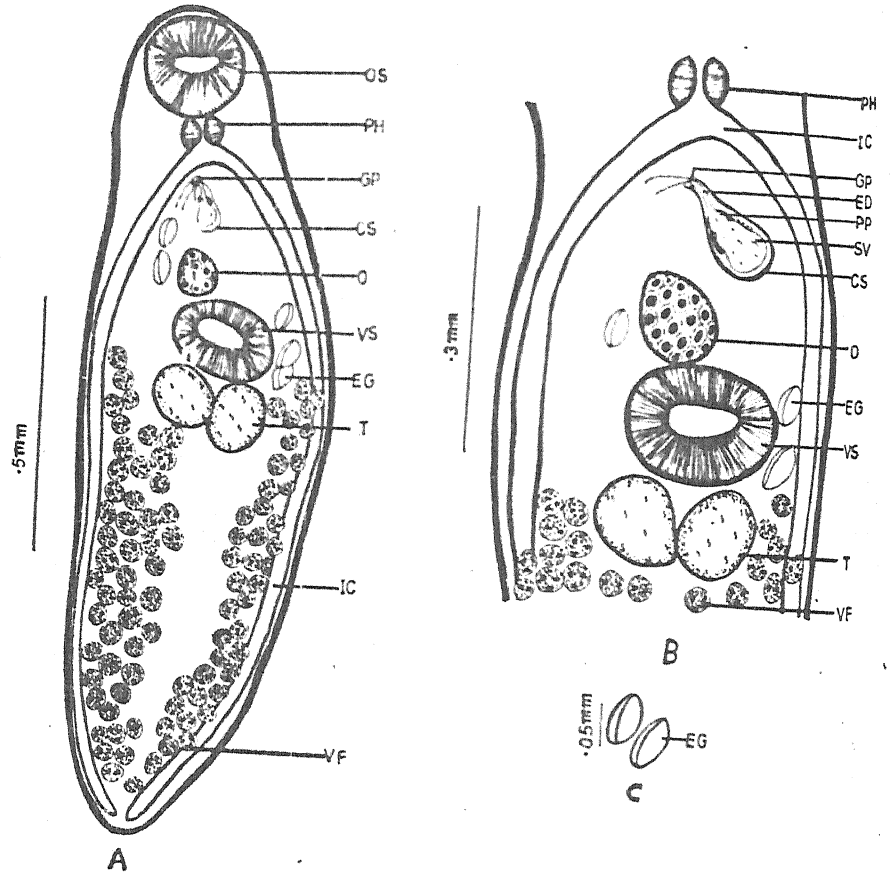


Fig. A.

Fig. B.

Fig. C.

Pycnadena pokhrayansis n.sp.

(Plate No. 18)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac, ovary, ventral sucker and testes etc. enlarged (drawn from live specimen).

Fig. C. Eggs enlarged.

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FAMILY : OPECOELIDAE

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## Neopodocotyle laxmibaii n.sp.

(Plate No. 19)

| | | |
|---|---|---|
| Host | : | Labio rohita (Ham.) |
| Location | : | Intestine |
| Locality | : | Kanpur Fish Market |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 4 |

### Description

Body elongated, smooth, blunt anterior end, slightly tappering posterior end. Oral sucker subterminal, rounded. Ventral sucker pre-equatorial, spherical, larger than oral sucker. Pre-pharynx absent. Pharynx oval or rounded, muscular. Oesophagus long. Intestinal caeca reaching up to the posterior end of the body. Testes tandem, trangular, elongated, oval, post equatorial, posterior testis larger than the anterior testis. Cirrus sac elongated, extends from just behind posterior end of ventralsucker up to the intestinal bifurcation, encloses a bipartite vesicula seminalis, a short pars prostatica surrounded with numerous prostat gland cells and a long narrow ejaculatory duct. Ovary pre-testicular, spherical or rounded, just post equatorial. Receptaculum

seminis pouch like, situated anterior to ovary. Uterus pretesticular, limited extends not beyond the anterior testis and finally opens through metraterm at the genital pore. Shell gland numerous and surrounded the ootype. Laurer's canal not seen. Eggs oval operculated. Genital pore median, bifurcal. Vitelline follicles extend from intestinal bifurcation up to hind end of body. Where they are merged together. Two vitelline duct unite to form a vitelline reservoir which opens at ootype through a commonvitelline duct. Excretory bladder tubular and elongated, excretory pore at the hind end of body.

## Measurements

Body length 2.080, width 0.640; oralsucker 0.155 x 0.145; ventral sucker 0.230 x 0.215; pre-pharynx absent. Pharynx 0.11 x 0.12; oesophagus 0.19 x 0.05; anterior testis 0.270 x 0.175; posterior testis 0.350 x 0.215; cirrus sac 0.545 x 0.60; vesicula seminalis 0.160 x 0.050; pars prostatica 0.095 x 0.020; ejaculatory duct 0.270 x 0.010; ovary 0.155 x 0.135; receptaculum seminis 0.17 x 0.07; egg 0.060 x 0.035.

## Discussion

The genus Neopodocotyle was erectd by Dayal in 1944, in a note, with N. indica as type species which was obtained from the intestine of Callichrous bimaculatus. Its detailed account

however, was published by him in 1950. Yamaguti, 1958 reduced it to a rank of subgenus under Podocotyle (Dujardin, 1845) Odhner, 1905 and was placed under the sub-family Allocreadinae Looss, 1902 of the family Allocreadiidae (Looss, 1902) Stossich, 1903. However, Mehra (1966) retained Neopodocotyle as a distinct genus under sub-family Plagioporinae Manter, 1947 of the family Opecoelidae Ozaki, 1925. Furthermore, Pritchard (1966) transferred M. indica under the genus Allocreadium as A. indica. Subsequently, Gupta and Chakrabarti (1967) described N. lucknowensis and Rai (1971) added N. mehrai from the intestine of Puntius sarana Yamaguti (1958) included under the genus Podocotyle five subgenera viz. Podocotyle (Dujardin, 1845) Odhner, 1905, Neopodocotyle Dayal, 1944, Apopodocotyle Pritchard, 1966. Neopodocotyloides Pritchard, 1966 and Peduneulotrema Fischthal and Thomas, 1970.Baugh and Chakrabarti (1970) erected a new genus Puntiotrema on the basis of presence of genital sucker and named N. lucknowensis. Gupta and Chakrabarti, 1967, as P. lucknowensis. Rai (1971) and Pandey (1975) differ from Pritchard's view and considered Neopodocotyle as a distinct genus. However the writer agrees with Yamaguti (1958) and regards Neopodocotyle as a subgenus of Podocotyle because the position of uterus in between ovary and anterior testis is of

subgeneric importance.

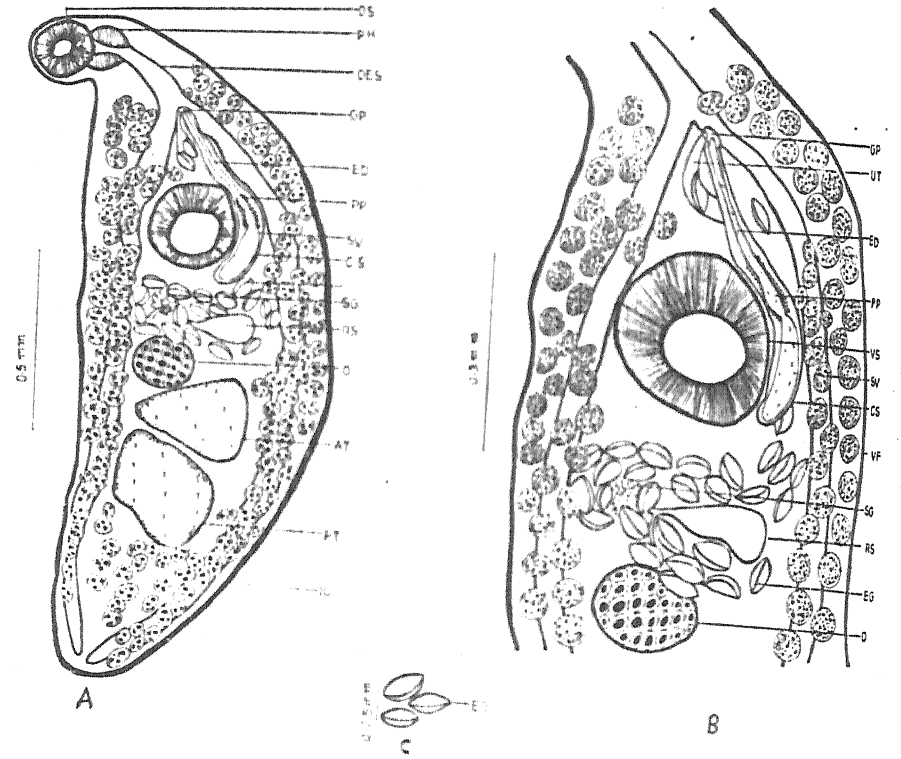
To the best of my knowledge, so for 7 species of the subgenus Neopodocotyle Dayal, 1944 are known viz. N. indica Dayal, 1944 from Callichrous bimaculatus, N. spinopora Sircar and Sinha, 1969 from Rita rita, N. mehrai Rai, 1971 from Puntius (Barbus) sarana and P. (Barbus) sophore, N. ballianensis Pandey, 1975 from P. (Barbus) sarana; N. chauhani Agrawaland Agrawal, 1980 from P. sarana and N. matatilaensis, Agrawaland Agrawal, 1980 from P. sophore. The present form chiefly differs from all the known species in the ratio and size of oral sucker and ventral sucker, in the size of posterior testis and in the extension of vitelline follicles.

It further differs from N. indica, N. spinopora, N. ballianensis and N. matatilaensis in the position of genital pore.

It also differs from N. mehrai in the size of oesophagus from N. dayali in the position of cirrus sac and form N. chauhani in the shape of the ovary and for the 1st time L. rohita is added as an additional host.

In the view of these differences the present form considered as new species with specific name N. laxmibaii n.sp. is named in the honbour of Maharani Laxmibai, a brave freedom fighter of this country.

# PLATE - 19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Neopodocotyle laxmibaii n.sp.

(Plate No. 19)

Fig. A. Entire worm.

Fig. B. A part of body showing position of cirrus sac, ovary and receptaculum seminis etc. enlarge (drawn from live specimen).

Fig. C. Eggs enlarged.

## Neopodocotyle hanumanthai n.sp.

(Plate No. 20)

| | | |
|---|---|---|
| Host | : | Labio rohita (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 15 |

### Description

Body elongated, smooth, slightly tappering anterior end and rounded posterior end. Oral sucker subterminal, sphrical, roundd, ventral sucker pre-equatorial, rounded, larger than the oral sucker. Pre-pharynx absent. Pharynx rounded, muscular. Oesophagus short, tubular, thick. Intestinal caeca reaching upto the posterior end of the body. Testes tandem, rounded, posterior testis larger than the anterior testis. Cirrus sac elongated extend from just posterior to ventralsucker, up to intestinalbifurcation. Long vesicula seminalis, short pars prostatica, surrounded by numerous prostate gland cells and a long, narrow, tubular ejaculatory duct. Ovary pretesticular, pre-equatorial, rounded, posterior to ventralsucker. Receptaculum seminis post ovarian, pre-

testicular, slightly visible. Uterus pre-testicular, limited extend not beyond the anterior testis and finally opens through metraterm at genital pore. Shell glands numerous and surrounded the ootype. Laurer's canal not seen, eggs oval, operculated. Genital pore median, anterior to ventral sucker and situated middle of intestinal bifurcation and ventralsucker. Vitelline follicles extend from middle of ventral sucker up to hind end of body. Two vitelline ducts unite toform a vitelline reservoir. Which opens at ootype through a common vitelline duct. Excretory bladder tubular and elongated. Excretory pore at the hind end of body.

## Measurements

Body length 2.80, width 0.88; oral sucker 0.210 x 0.270; ventral sucker 0.375 x 0.315; prepharynx absent, pharynx 0.095 x 0.16; oesophagus 0.05 x 0.045; anterior testis 0.340 x 0.355; posterior testis 0.440 x 0.345; cirrus sac 0.620 x 0.045; vesicula seminalis 0.18 x 0.055; pars prostatica 0.110 x 0.020; ejaculatory duct 0.310 x 0.010; ovary 0.250 x 0.220; receptaculum absent; egg 0.090 x 0.045.

## Discussion

The genus Neopodocotyle was erected by Dayal in 1944, in

a note, with N. indica as type species which was obtained from the intestine of Callichrous bimaculatus. Its detailed account however, was published by him in 1950. Yamaguti, 1958 reduced in to a rank of subgenus under Podocotyle (Dwjardin, 1845) Odhner, 1905 and was placed under the subfamily Allocreadinae Looss, 1902 of the family Allocreadiidae (Looss, 1902) Stossich, 1903. However, Mehra (1966) retained Neopodocotyle as distinct genus under subfamily Plagioporinae, Manter, 1947 of the family Opecoelidae Ozaki, 1925. Furthermore, Pritchard (1966) transferred N. indica under the genus Allocreadium as A. indica subsequently, Gupta and Chakrabarti (1967) described N. lucknowensis and Rai (1971) added N. mehrai from the intestine of Puntius sarana. Yamaguti (1958) included under the genus Podocotyle five subgenera viz., Podocotyle (Dujardin, 1845) Odhner, 1905, Neopodocotyle Dayal, 1944. Apopodocotyle Pritchard, 1966, Neopodocotyloides Pritchard, 1966 and Peduneulotrema Fishthal and Thomas, 1970. Baugh and Chakrabarti (1970) erected a new genus Puntiotrema on the basis of presence of genital sucker and named N. lucknowensis Gupta and Chakrabarti, 1967, as P. lucknowensis. Rai (1971) and Pandey 91975) differs from Pitchard's view an considered Neopodocotyle as distinct genus. However, the writer agrees with Yamaguti 91958) and regards Neopodocotyle as a subgenus

of Podocotyle because, the position of uterus in between ovary and anterior testis, is of subgeneric importance.

To the best of my knowledge, so far 8 species of the subgenus Neopodocotyl Dayal, 1944 are known viz. N. indica Dayal, 1944 from Callichrous bimaculatus; N. spinopora Sircar and Sinha, 1969 from Rita rita;N. mehrai Rai, 1971 from Pantius (Barbus) sarana and P. (Barbus) sophore, N. ballianensis Pandey, 1975 from labeo calbasu,N. dayali Pandey, 1975, from P. (Barbus) sarana, N. chauhani. Agrawal and Agrawal 1980 from P. sarana and N. matatilaensis Agrawaland Agrawal, 1980 from P. sophore and N. laxmibaii n.sp. earlier described by Agrawaland Sachan from Labio rohita.

The present form belongs to genus Neopodocotyle Dayal, 1944 and differs from N. sinopora, N. mehrai, N. balliansis, N. dayali, in the extensionof cirrus sac, size of posterior testis, in the size of ventral sucker, and in the opening of genital pore.

It also differs from N. indica, N. chauhanai and N. matatiliansis by having short oesophagus and in the extension of vitelline follicles.

It further differs N. spinopora, N. ballansis, N. mehrai, N. dayali in the size of ventral sucker and presence of

parsprostatica, except in N. balliansis.

And it differs from N. laxmibaii in the size of oesophagus, in the ratio of ventral and oral; suckers in the position of ovary, shape of the testes, in the extension of vitelline follicles.

In the view of these differences the present form considered new species name Neopodocotyle hanumanthai n.sp.

The new species is named in the honour of Professor K. Hanumantha Rao, a reputed Parasitologist of this country.

# PLATE - 20

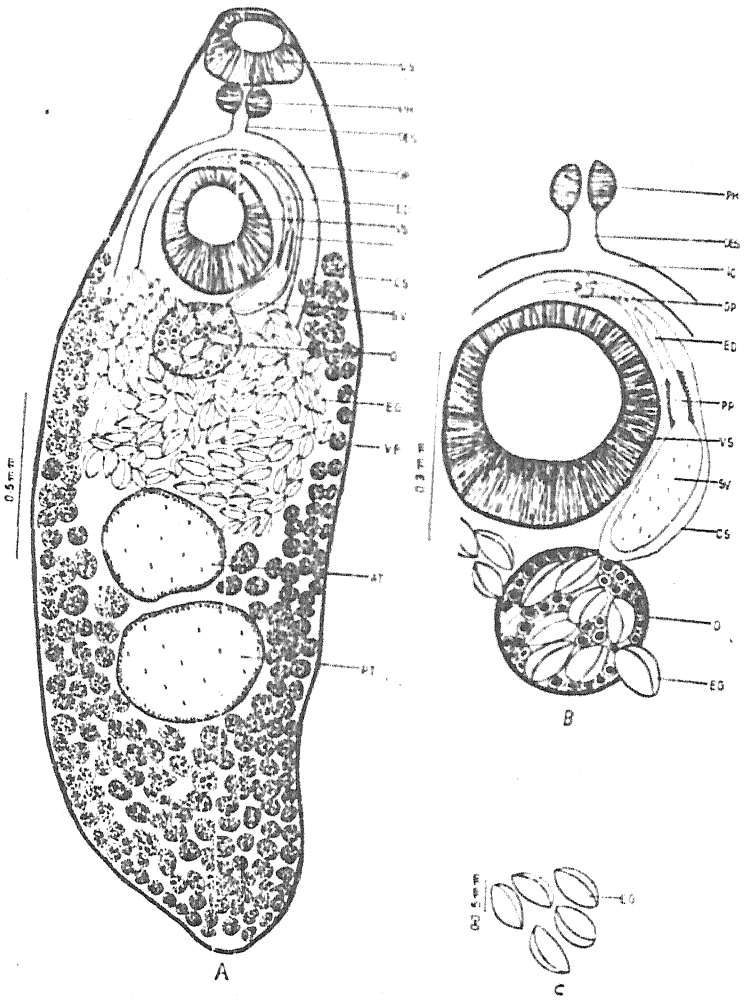


Fig. A.

Fig. B.

Fig. C.

Neopodocotyle hanumanthai n.sp.

(Plate No. 20)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing position of cirrus sac and ovary etc. enlarged (drawn from live specimen).

Fig. c. Eggs enlarged.

## Podocorchis gangi n.subgenus, n.sp.*

(Plate No. 21)

| | | |
|---|---|---|
| Host | : | Channa marulius (Ham. & Buck.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 200 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 6 |

### Description

Body smooth, elongated, eleptrical. Oralsucker subterminal, circular or spherical. Ventral sucker spherical or rounded, pre-equatorial, muscular, larger than oral sucker. Pre-pharynx absent. Pharynx rounded, muscular. Oesophagus tubular long or short. Intestinal caeca reaching up tohind end of body. Testes tandem or oval, just post equatorial, post-ovarian, posterior testis larger than anterior testis. Cirrus sac submedian, extend anterior to ventral sucker, marginal extracaecal, encloses vesicula seminalis sac like, small pars prostatica, surrounded with prostate gland cells. Ejaculatory

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* A full length paper on this species has been accepted for publication in the journal "Indian Journal of Helminthology".

duct small tubular. Ovary irregular oval or rounded, equatorial, in between ventral sucker and anterior testis. Receptaculum seminis elongated, situated left of ovary. Uterus arises from ootype and extend up to prebifurcal region anterior testis. Shell glands numerous and surrounded the ootype. Laurer's canal present. Eggs oval, yellow, and operculated. Genital pore marginal, extracaecal at the oesophageal or middle of oralsucker level on left side or near the intestinal bifurcation. Vitelline follicles circumcaecal confined to hind body may or may not confluent in post testicular area two vitelline duct unite to form a vitelline reservoir, which opens at ootype by a commonvitelline duct. Excretory bladder tubular, reaching to ovary or more anteriorly.

Measurements

Body length 1.150-1.160, width 0.525-0.530; oralsucker 0.110-0.115 x 0.125-0.130; ventral sucker 0.180-0.185 x 0.150-0.155; pre-pharynx absent; parynx 0.045 x 0.064; oesophagus 0.04 x 0.025; anterior testis 0.225-0.260 x 0.110-0.115; posterior testis 0.265-0.270 x 0.130-0.135; cirrus sac 0.215-0.220 x 0.060-0.065; vesicula seminalis 0.085-0.090 x 0.050-0.055; pars prostatica 0.040-0.045 x 0.015; ejaculatory duct

0.080-0.085 x 0.010; ovary 0.130-0.135 x 0.060-0.065; receptaculum seminis 0.18 x 0.05; egg 0.060-0.065 x 0.030-0.035.

## Discussion

The present form belongs tothe subfamily Plagioporinae Manter, 1947 of the family Opecoelidae Ozaki, 1925. Yamaguti (1971) has recorded 22 genera. Under the subfamily Plagioporinae and since then four more genera have been added tothis subfamily viz., Anthochoanocotyle by Kamegai, 1972, Olivacreadium by Bilqees, 1976, Godavaritrema by Kayrakarte and Yadav, 1976, Gangatrema by Agrawaland Kumar, 1980. The present form comes closer to Podocotyle (Dugardin, 1845) syn Sinistroporus Stafford, 1904 Allopodocotyle Prtichard, 1966.

Ventral sucker pre-equatorial, sessile testes tandem or oblequely tandem, post equatorial, towards the end of body. Cirrus pouch well developed, usually claviform, may or may not extend, posterior to ventral sucker. No external seminal vesicles. Genital pore usually submedian. Ovary submedian, pre-testicular. Receptaculum seminis and Larer's canal present. Vitellaria circumeoecal. Excretory vesicle tubular, reaching to the ovary or more anteriorly, whereas it differs from Podocotyle in the position of genital pore, marginal, extracaecal at the oesophagial or middle of oral sucker level

and in the position of cirrus sac submedian, bifurcal, preacetabular, marginal extend up to the anterior margine of ventralsucker to oralsucker. In the openion of the writer these characters are subgeneric importance. Therefore, in order to accumulate the present form a new subgenus Podocorchis is establish with new species gangi n.sp.

The species is named after the name of the river Ganga from which the host is collected.

## Subgeneric diagnosis

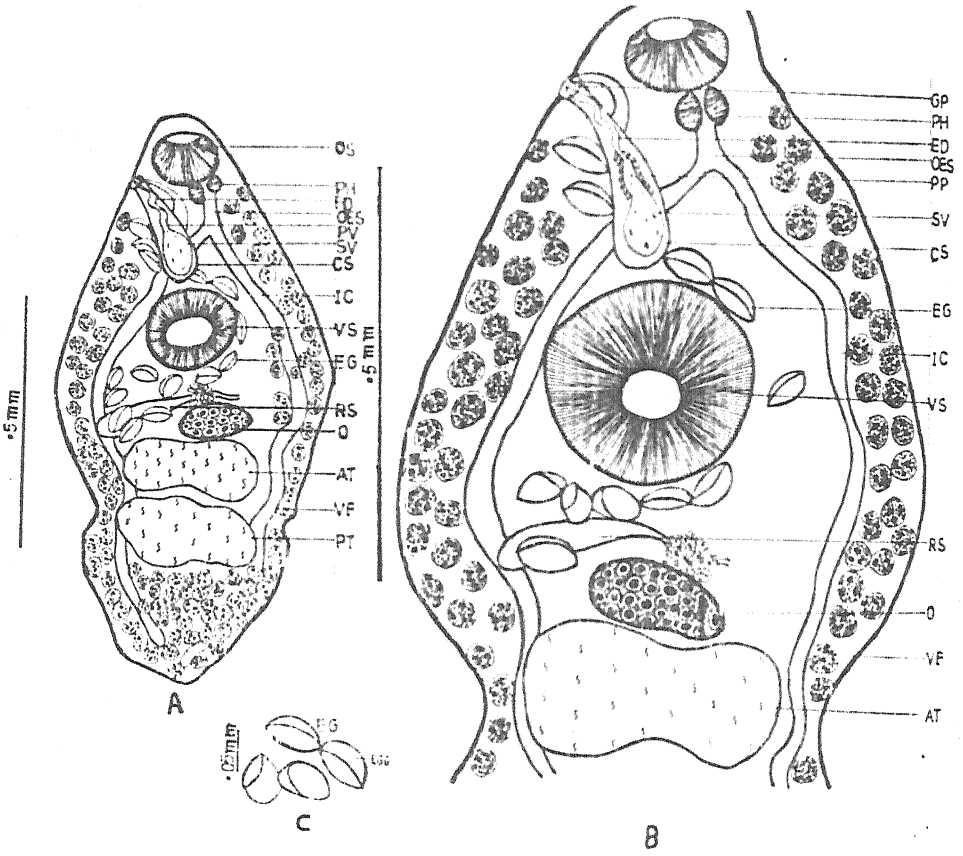
Opecolidae, Plagioporinae body elongated, smooth, eleptrical. Oral sucker, subterminal, circular or rounded, ventralsucker spherical or rounded, pre-equatorial, muscular larger than the oral sucker. Pharynx rounded muscular. Oesophagus tubular, long or short. Intestinal caeca reaching up to hind end of body. Testes, tandem, just post equatorial, post ovarian, posterior testis larger than the anterior testis. Cirrus sac submedian extend up to ventral sucker to marginal, extracaecal, encloses vesicula seminalis sac like, small pars prostatica surrounded with prostate gland cells and a small ejaculatory duct present. Ovary oval, irregular equatorial, in between ventral sucker and anterior testis. Receptaculum seminis elongated, sac like, situated left of

ovary. Uterus arises from ootype and extend up to anterior testis to prebifurcal region. shell glands numerous and surrounded the ootype. laurer's canal present. Eggs oval, yellow and opeculated. Genital pore marginal, extracaecal at the oesophagial or middle of oral sucker level. On the left caecum near the intestinalbifurcation. Vitalline follicles circumcaecal, confined to hind body, may or may not confluent in post-testicular area. Two vitelline duct unite to form a vitelline reservoir which opens at ootype by a common vitelline duct. Excretory bladder tubular reaching to ovary or more anteriorly. Intestinal parasite of fresh water fishes.

"Key to subgenera of Podocotyle Pritchard, 1966"

| | | |
|---|---|---|
| 1. | Genital pore almost median bifurcal or post bifurcal | Apopodocotyle |
| | Genital pore difinitly subedian | 2 |
| | or | |
| | Genital pore marginal, extracaecal at the oesophagealor middle of oral sucker level | 3 |
| 2. | Ovary separated from anterior testis by uterus | Neopodocotyle |
| | Ovary not separated from anterior testis by uterus | 4 |
| 3. | Vitelline follicles circumcaecal confined to hind body reaching up to oesophagus | n.sub.gen. |
| | Vitelline follical circumcaecal confined tohind body may or may not confluent in post testicular area | 4 |
| 4. | Acetabulum distinctly pedunculate | 5 |
| | Acetabulum not distinctly pedunculate | Podocotyle |
| 5. | Seminal vesicle constricted into two portions posteriorly | Pedunculotrema |
| | Seminal vesicle not constricted into two portions posteriorly | Neopodocotyloides |

# PLATE - 21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Podocorchis gangi n.subgenus, n.sp.*

(Plate No. 21)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, ovary, receptaculum seminis, ventral sucker etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

## Podocorchis maruli n.sp.

(Plate No. 22)

| | | |
|---|---|---|
| Host | : | Channa marulius (Ham. & Buch.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 200 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 4 |

### Description

Body smooth, elongated, slightly tappering anterior end and rounded posterior end. Oral sucker sub-terminal, rounded, spherical or oval. Ventral sucker pre-equatorial half extra and half intra caecal, rounded or spherical, muscular, larger than the oral sucker. Pre-pharynx short. Pharynx rounded or oval, muscular. Oesophagus short. Intestinal caeca reaching up to hind end of body. Testes tandem or oblequily tandem, oval, equal post ovarian, situated hind region of body. Cirrus sac submedian, extend anterior to the ventralsucker, marginal, extracaecal, encloses vesicula seminalis small sac like, small pars prostatica surrounded with numerous prostate gland cells. Ejaculatory duct small tubular. Ovary oval or rounded, just post equatorial. Receptaculum seminis sac like, pre-ovarian.

Uterus arises from ootype extend up to marginal prebigurcal to anterior testis. Shell glands numerous and surrounded the ootype. Laurer's canal present. Eggs oval operculated yellow. Genital pore marginal, extracaecal, at the intestinal bifurcal level. Vitelline follicales circum caecal confined to hind body may or may not confluent in post testicular area. Two vitelline duct unite to form a vitelline reservoir which opens at ootype by a common vitelline duct. Excretory bladder tubular reaching to ovary or more anteriorly.

## Measurements

Body length 1.13-1.14; width 0.513-0.520; oral sucker 0.110-0.115, width 0.10-0.12; ventralsucker 0.220-0.225 x 0.21-0.215; pre-phrynx 0.02 x 0.02; pharynx 0.06 x 0.1; oesophagus 0.035 x 0.030; anterior testis 0.220-0.225 x 0.130-0.135; posterior testis 0.220-0.225 x 0.130-0.135; cirrus sac 0.135-0.140 x 0.06-0.62; vesicula seminalis 0.035-0.040 x 0.04-0.04; pars prostatica 0.03-0.035 x 0.015; ejaculatory duct 0.110-0.105 x 0.01; ovary 0.130-0.135 x 0.085-0.090; receptaculum seminis 0.08 x 0.035; egg 0.065-0.070 x 0.035-0.040.

## Discussion

The present form belongs tosubgenus Podocorchis. It differs from known species P. gangi in the position and size of cirrus sac, in the position of genital pore, in the size of ovary and shape of testes.

It is, therefore, regarded as a new species P. marulii n.sp. the name of the new species is given after the name of the host from which parasite is collected.

# PLATE - 22

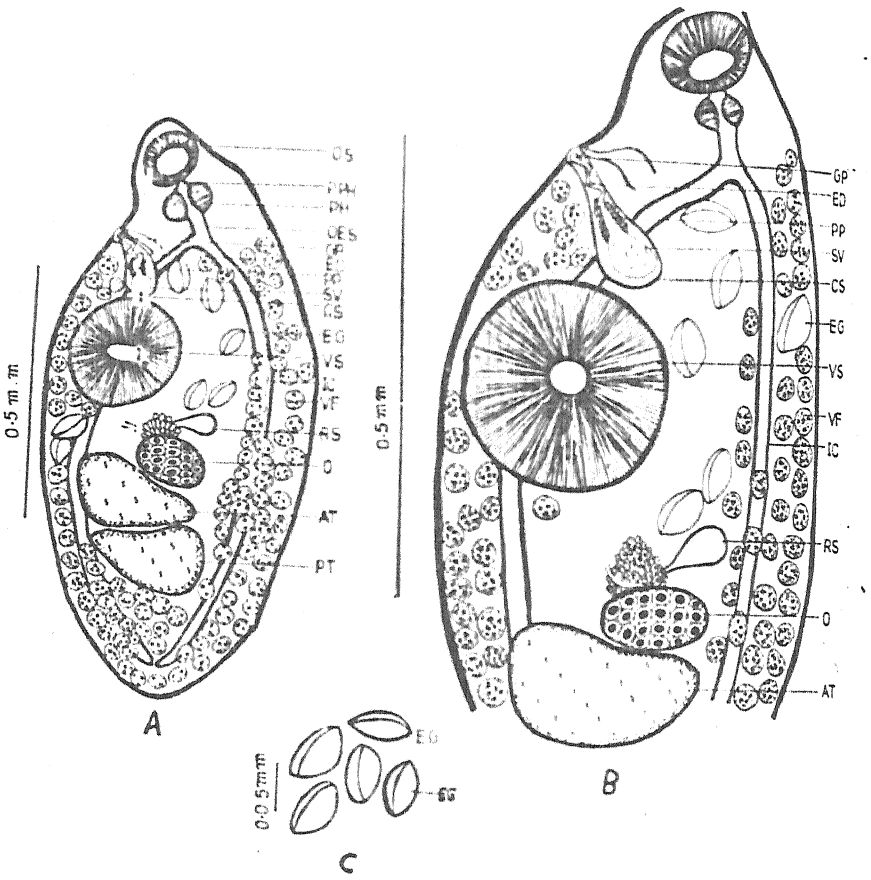


Fig. A.

Fig. B.

Fig. C.

Podocorchis maruli n.sp.

(Plate No. 22)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, ovary, ratio of ventral and oral sucker, receptaculum seminis etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

## Podocorchis vittatusi n.sp.*

(Plate No. 23)

| | | |
|---|---|---|
| Host | : | Mystus vitattus (Cuv. & Bloch.) |
| Location | : | Intestine |
| Locality | : | Kanpur fish market |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 4 |

### Description

Body smooth, elongated, rounded anterior and slightly tappering posterior ends. Oral sucker subterminal, rounded, oval or spherical, muscular, larger than ventralsucker. Ventral sucker pre-equatorial, muscular. Pre-pharynx absent. Pharynx oval or rounded muscular. Oesophagus absent. Intstinal caeca reaching up to hind end of body. Testes tandem or oblequily tandem, equatorial or post equatorial, elongated, oval, unequal, anterior testis larger than posterior testis. Cirrus sac submedian, extending up to anterior to ventral sucker. Long tubular vesicula seminalis, long pars prostatica,

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* A full length paper on this genus and species has been communicated for publication in the "Journal of Scientific Research", Banaras Hindu University, Banaras.

surrounded with numerous prostate gland cells. Ejaculatory duct long tubular. Ovary spherical, rounded or oval, post acetabular or situated in between ventral sucker and anterior testis. Receptaculum seminis small sac like. Uterus arises from ootype, extend up to anterior testis, numerous shell glands surrounded the ootype. Laurer's canal present. Eggs rounded, embryonic, yellow or black, non-operculated. Genital pore marginal, extracaecal at the prepharyngeal level on left side. Vitelline follicles extending from acetabulam to hind end of body, intra and extracaecal. Two vitelline duct unite toform a vitalline reservoir which opens at ootype by a common vitalline duct. Excretory bladder tubular reaching to ovary or more anteriorly.

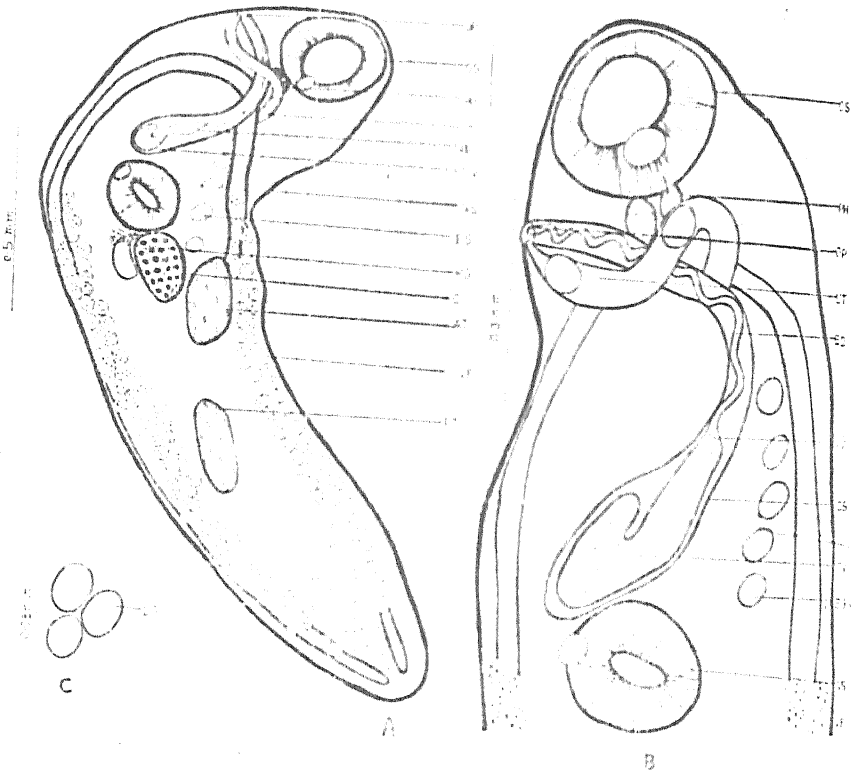
Measurements

Body length 2.35, width 0.50; oral sucker 0.260 x 0.240; ventralsucker 0.190 x 0.210; pre-pharynx absent; pharynx 0.030 x 0.075; oesophagus absent. Anterior testis 0.240 x 0.115; posterior testis 0.255 x 0.090; cirrus sac 0.565 x 0.055; vesicula seminalis 0.075 x 0.050; pars prostatic 0.180 x 0.030; ejaculatoryduct 0.380 x 0.010; ovary 0.180 x 0.125; receptaculum semin 0.10 x 0.05; gg 0.055 x 0.040.

## Discussion

The present form belongs to sub genus Podocorchis of Podocotyle (Dujardin, 1845) Synsinistroporus Stafford, 1904. Allopodocotyle Pritichard, 1966. It differs from in its known species P. maruli having large oral sucker than ventral sucker in the shape and position of testes, extension of vitelline follicles and in the egg which are embryonated in order to accumulate the present form a new species P. vittatusi is established. The species is named after the name of host from which parasite is collected.

# PLATE - 23



## *Podocorchis vittatusi* n.sp.*

(Plate No. 23)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac, ventral sucker and position of genital pore etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

## *Eucreadium satpali* n.sp.*

(Plate No. 24)

| | | |
|---|---|---|
| Host | : | *Oxygaster bacaila* (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 200 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 5 |

### Description

Body elongated, smooth, with rounded anterior and tappering posterior end. Oral sucker subterminal, large, spherical or oval with minute spines. Ventral sucker pre-equatorial, spherical or rounded and larger than oral sucker. Pre-pharynx absent. Pharynx oval, globular and muscular. Oesophagus absent. Intestinal caeca massive and thick rinkeled, reaching up to posterior end of body. Testes oblequily tandem, more or less equal, post equatorial, just post ovarian. Cirrus sac extends from middle of the ventral sucker extend up to the just intestinal bifurcation,

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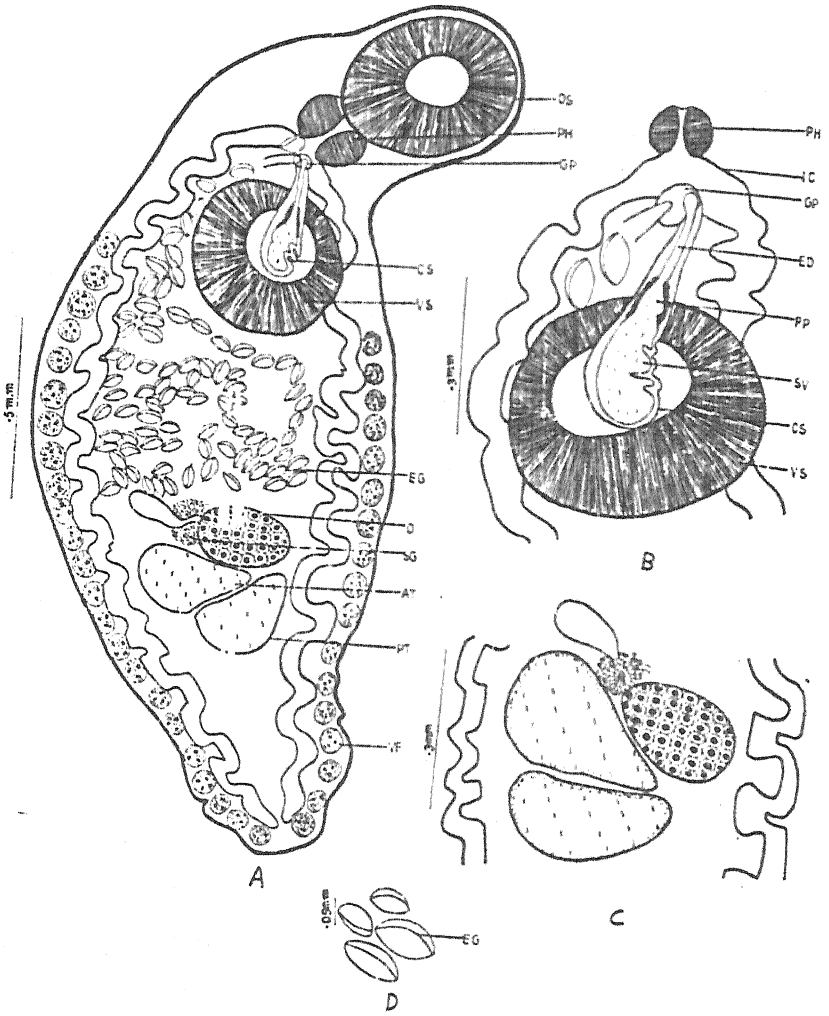
* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology".

intercaecal, enclosing M shaped vesicula seminalis. A tubular pars prostatica surrounded with prostate gland cells and a short ejaculatory duct. Ovary entire oval or rounded, just post-equatorial, pre-testicular. Receptaculum seminis elongated, sac like and pre-testicular. Uterus extends up to anterior testis, and finally opens at genital pore by a metraterm. A large number of shell glands surrounded the ootype. Laurer's canal present. Eggs oval large, operculated. Genital pore at the level of intestinal bifurcation, intercaecal. Vitelline follicles extend from posterior region of ventral sucker up to the hind end of body. Two vitelline duct unite to form a vitelline reservoir, which opens at ootype by a short duct. Excretory bladder tubular, excretory pore terminal.

Measurements

Body length 2.540, width 0.870; oralsucker 0.470 x 0.360; ventral sucker 0.410 x 0.380; pre-pharynx absent, pharynx 0.130 x 0.200; oesophagus absent. Anterior testis 0.285 x 0.165; posterior testis 0.260 x 0.150; cirrus sac 0.340 x 0.090; vesicula seminalis 0.115 x 0.045; pars prostatica 0.070 x 0.025; ejaculatory duct 0.125 x 0.020; ovary 0.245 x 0.165; receptaculum seminis 0.15 x 0.06; egg 0.060 x 0.035.

# PLATE - 24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Eucreadium satpalai n.sp.*

(Plate No. 24)

Fig. A. Entire worm.

Fig. B. Showing cirrus sac enlarged

(drawn from live specimen)

Fig. C. A part of body showing ovary, receptaculum, testes

etc. enlarged (drawn from live specimen).

Fig. D. Eggs enlarged.

## Nicolla chauhani n.sp.*

(Plate No. 25)

| | | |
|---|---|---|
| Host | : | Mastacembelus armatus (Lac.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 500 |
| No. of fish infected | : | 2 |
| No.of specimen collected | : | 6 |

### Description

Body elongated, rounded anterior and posterior ends. Oral sucker subterminal, muscular, oval or rounded, larger than ventral sucker. Ventralsucker pre-equatorial, muscular circular or oval. Pharynx small, rounded, muscular. Oesophagus absent. Intestinal caeca united near posterior end of body. Testes oval, equatorial, unequal, oblequily tandem. Cirrus sac elongated, large. Genital pore in between oral sucker. Vesicula seminalis sac like. Pars prostatica large surrounded with large number of prostate gland cells. Ejaculatory duct long tubular. Ovary sub equatorial, rounded or oval, or

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* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology".

spherical, in between anterior and posterior testis, situated right side of anterior testis. Receptaculum seminis pre-testicular, small. Vitelline follicles extending from anterior region of oral sucker up to posterior end of body. Uterus arises from ootype extending anteriorly and opens at genital pore. Eggs oval, large, operculated. Genital pore at the posterior end of oral sucker. Excretory bladder tubular, reaching up to posterior testis, excretory pore terminal.

## Measurements

Body length 1.28, width 0.30; oral sucker 0.270 x 0.145; ventral sucker 0.10 x 0.09; prepharynx absent; pharynx 0.03 x 0.015; oesophagus absent. Anterior testis 0.085 x 0.055; posterior testis 0.095 x 0.055; cirrus sac 0.330 x 0.075; vesicula seminalis 0.115 x 0.055; pars prostatica 0.055 x 0.035; ejaculatory duct 0.130 x 0.010; ovary 0.085 x 0.090; receptaculum seminis 0.025 x 0.01; egg 0.110 x 0.075.

## Discussion

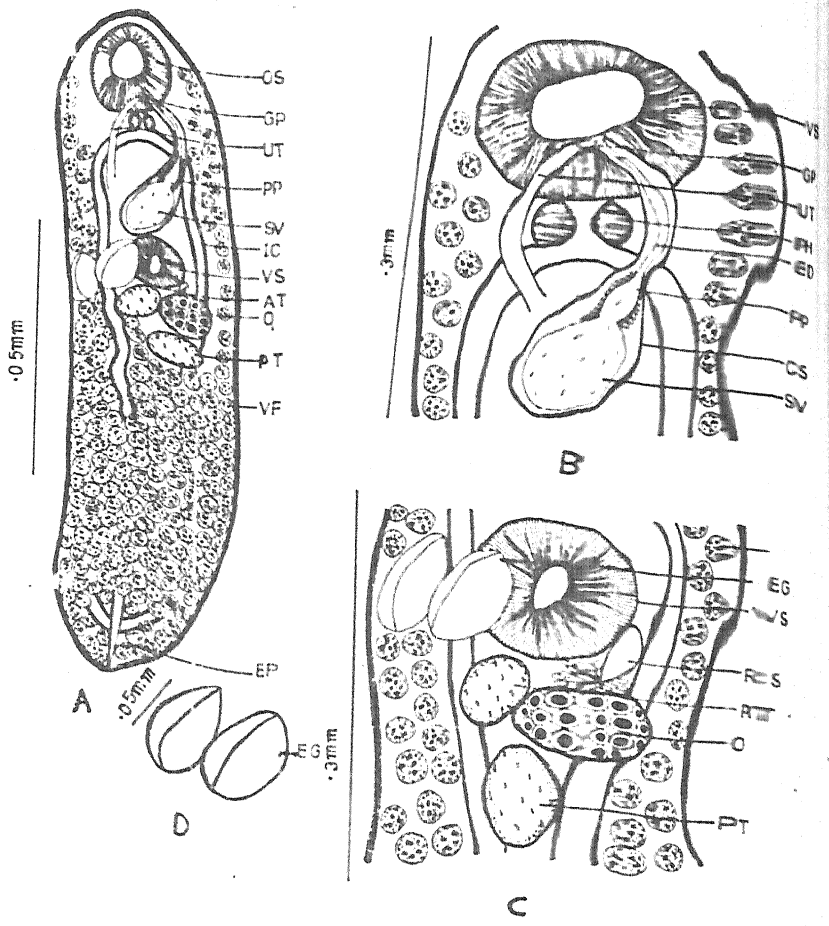
The present form belongs to genus *Nicolla* Wisniewski, 1934 with *N. skrijabini* its genotype. So far 10 other species of this genus viz., *N. testiobliqua* Wisniewski, 1933. *N. macrostomum* (Pigulewsky, 1931) Wisniewski, 1934. *N. wisniewsk* Slusarki, 1958. *N. timoni* Rebeeq et Giudicelli, 1959. *N.*

indica Srivastava, 1968. N. allahabadensis Srivastava, 1968 and N. halichoeri Overstreet, 1969. N. ritai Agrawal and Sharma, 1989. N. fotedari Agrawal and Sharma, 1989 have been reported from entire world.

It differs from all the known species of this genus in having oral sucker larger than ventralsucker, in the position of the ovary, in the size of eggs and in the position of testes which is more or less in the equatorial region. Therefore, a new species N. chauhani n.sp. is formed for its reception.

The new species is named in the honour of Dr. B.s. Chauhan, a well reputed Helminthologist of India.

# PLATE- 25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Nicolla chauhani n.sp.*

(Plate No. 25)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac (drawn from live specimen).

Fig. C. A part of body showing position of testis, ovary, ventral sucker and eggs etc. enlarged (drawn from live specimen).

Fig. D. Egg enlarged.

## Nicolla dayalii n.sp.*

(Plate No. 26)

| | | |
|---|---|---|
| Host | : | Rita rita (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 300 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 5 |

### Description

Body elongated, spinose, rounded anterior and slightly tappering posterior end. Oral sucker subterminal, oval or rounded or spherical, spinose, larger than ventral sucker. Ventral sucker rounded, or oval, pre-equatorial. Prepharynx absent. Pharynx globular, muscular. Oesophagus small, tubular or long. Intestinal caeca united at the posterior end of body. Testes entire, just post equatorial tandem, or oblequily tandem, oval, over lapping or separated from each other, unequal. Cirrus sac elongated, extend from just anterior to ventral sucker up to oral sucker. Vvesicula seminalis

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* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology".

bipartite. Pars prostatica small, surrounded by numerous prostate gland cells. Ejaculatory duct long narrow. Ovary circular or oval, just pre-equatorial or equatorial. Receptaculum seminis-rounded, sac like, postovarian. Vitelline follicles extending from post testicular area up to hind end of body, confluent post testicular region, uterus arises from ootype, runs posteriorly then turns anteriorly to opens at genital pore. Eggs very small, ovoid, genital pore posterior to oral sucker or middle of oral sucker. Excretory bladder simple tubular excretory pore terminal.

## Measurements

Body length 1.620, width 0.240, oral sucker 0.150 x 0.175; ventral sucker 0.130 x 0.105; pre-pharynx absent; pharynx, 0.045 x 0.055; oesophagus, 0.03 x 0.02, anterior testis 0.060 x 0.045; posterior testis 0.070 x 0.045; cirrus sac 0.440 x 0.040; vesicula seminalis 0.130 x 0.05; pars prostatica 0.085 x 0.010; ejaculatory duct 0.190 x 0.010; ovary 0.065 x 0.055; receptaculum seminis 0.08 x 0.06; egg 0.015 x 0.010.

## Discussion

The new form belongs to genus Nicolla Wisniewask, 1934 with N. skrijabini and its genotype. So far eleven other

species are known viz. N. testiobliqua Wisniewski, 1933, N. macrostomum (Pigulewsky, 1931) Wisniewski, 1934, N. wisniewske Slusarki, 1958, N. timoni Rebeeq et Giudicell, 1959, N. indica Srivastava, 1968, N. allahabadensis Srivastava, 1968, N. halichoari Overstreet, 1969, N. fotedari Agrawal & Sharma, 1989, N. ritai Agrawaland Sharma, 1989, N. chauhani, Agrawal & Sachan, 1993 Mastacembelus armetus (Lac.). The present form differs from all the known species, in the presence of spines only in oral sucker region, in the presence of oesophagus, in the position and size of testes, in the extention of vitelline follicles, in the extension of cirrus sac up to pre acetabular.

Therefore it is regarded as new species with specific name N. dayalii n.sp.

The new species is named in the honour of Late Professor J. Dayal reputed helminthologist of the country.

# PLATE- 26

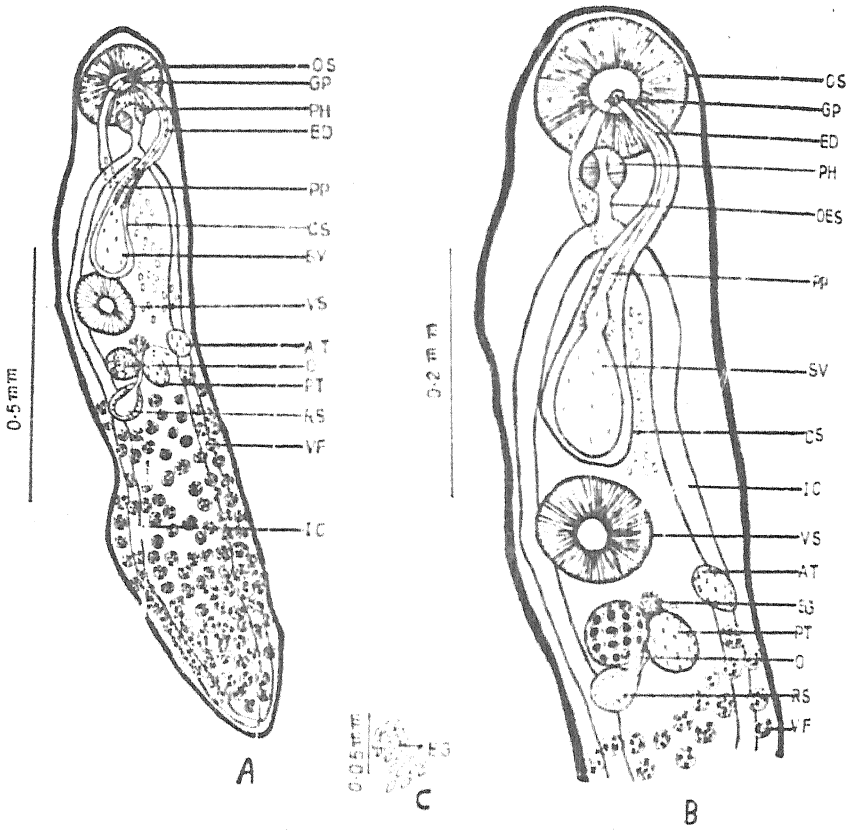



Fig. A.

Fig. B.

Fig. C.

Nicolla dayalii n.sp.*

(Plate No. 26)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac, ventral sucker, ovary, testes etc. enlarged (drawn from live specimen).

Fig. C. Eggs enlarged.

Nicolla dayalii n.sp.*

(Plate No. 26)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac , ventral sucker, ovary, testes etc. enlarged (drawn from live specimen).

Fig. C. Eggs enlarged.

Nicolla skrijabini (Iwanitzky, 1928) Wisniewski, 1933

(Plate No. 27)

| | | |
|---|---|---|
| Host | : | Rita rita (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 300 |
| No. of fish infected | : | 8 |
| No.of specimen collected | : | 35 |

## Description

Body elongated, smooth, rounded both ends. Oral sucker subterminal, spherical or subspherical. Ventral sucker spherical or rounded, larger, or more or less equal to oral sucker. Prepharynx absent or present. Pharynx globular muscular, large. Oesophagus absent or present. Intestinal caeca united at posterior end of body. Testes entire, spherical or rounded, triangular or doumble shaped or elongated unequal, post-equatorial, tandem or oblequely tandem, overlapping or separated, anterior testis smaller than the posterior testis. Cirrus sac small, sac like. Vesicula seminalis small, bipartite, pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct narrow, small. Ovary oval, rounded, posterior to the ventral

sucker, pretesticular. Receptaculum seminis ovoid, pretesticular, pre-equatorial. Vitelline follicles extending anterior end of oral sucker up to posterior end of body. Uterus arises from ootype, intercaecal and extracaecal, opening at genital pore. Egg small oval, non-operculated. Genital pore post bifurcal.

Excretory bladder tubular, excretory pore terminal.

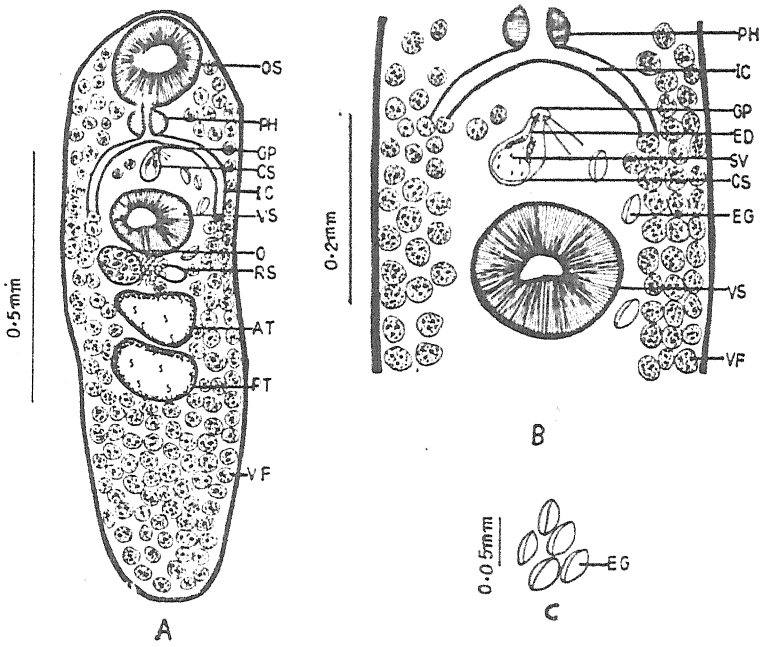
## Measurements

Body length 1.155, width 0.360; oral sucker 0.180 x 0.170, ventral sucker 0.125 x 0.155; prepharynx absent, pharynx 0.06 x 0.08; oesophagus absent; anterior testis 0.108 x 0.150; posterior testis 0.110 x 0.170, cirrus sac 0.07 x 0.04, vesicula seminalis 0.025 x 0.020; pars prostatica 0.020 x 0.005; ejaculatory duct 0.015 x 0.005; ovary 0.09 x 0.07; receptaculum seminis 0.05 x 0.03; egg 0.035 x 0.020.

## Discussion

The present form belongs to genus Nicolla Wisniewski, 1934. It closely resemble N. skrijabini Wisniewaski, 1934, but differs from it in the extension of cirrus sac, in the extension of vitelline follicles and in the position of genital pore. These differences are considered as individual variations.

# PLATE- 27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Nicolla skrijabini (Iwanitzky, 1928) Wishiewski, 1934

(Plate No. 27)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac ventral sucker, extension of vitelline follicles, etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

Nicolla halichoeri Overstreet, 1969

(Plate No. 28)

| | | |
|---|---|---|
| Host | : | Rita rita (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 300 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 8 |

## Description

Body elongated, smooth, rounded both ends, oral sucker subterminal, subspherical. Ventral sucker spherical or subspherical, pre-equatorial, larger or equal than oralsucker. Pre-pharynx absent. Pharynx globular, muscular. Oesophagus vary small. Intestinal caeca united near posterior end of body. Testes rounded, subspherical, unequal, post-equatorial, tandem or oblequely tandem, anterior testis larger than posterior testis. Cirrus sac, sac like, extending from in between intestinal bifurcation and ventral sucker. Vesicula seminalis bipartite. Pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct narrow short. Ovary oval or rounded, equatorial. Receptaculum seminis lateral or pre-ovarian, small. Vitelline follicles extending

from the level of ovary or posterior to ventral sucker, up to posterior end of body. Uterus arises from ootype then turns anteriorly and opens at genital pore. Egg large, operculated. Genital pore extracaecal, at the level of pharynx. Excretory bladder tubular, extending up to testis. Excretory pore terminal.

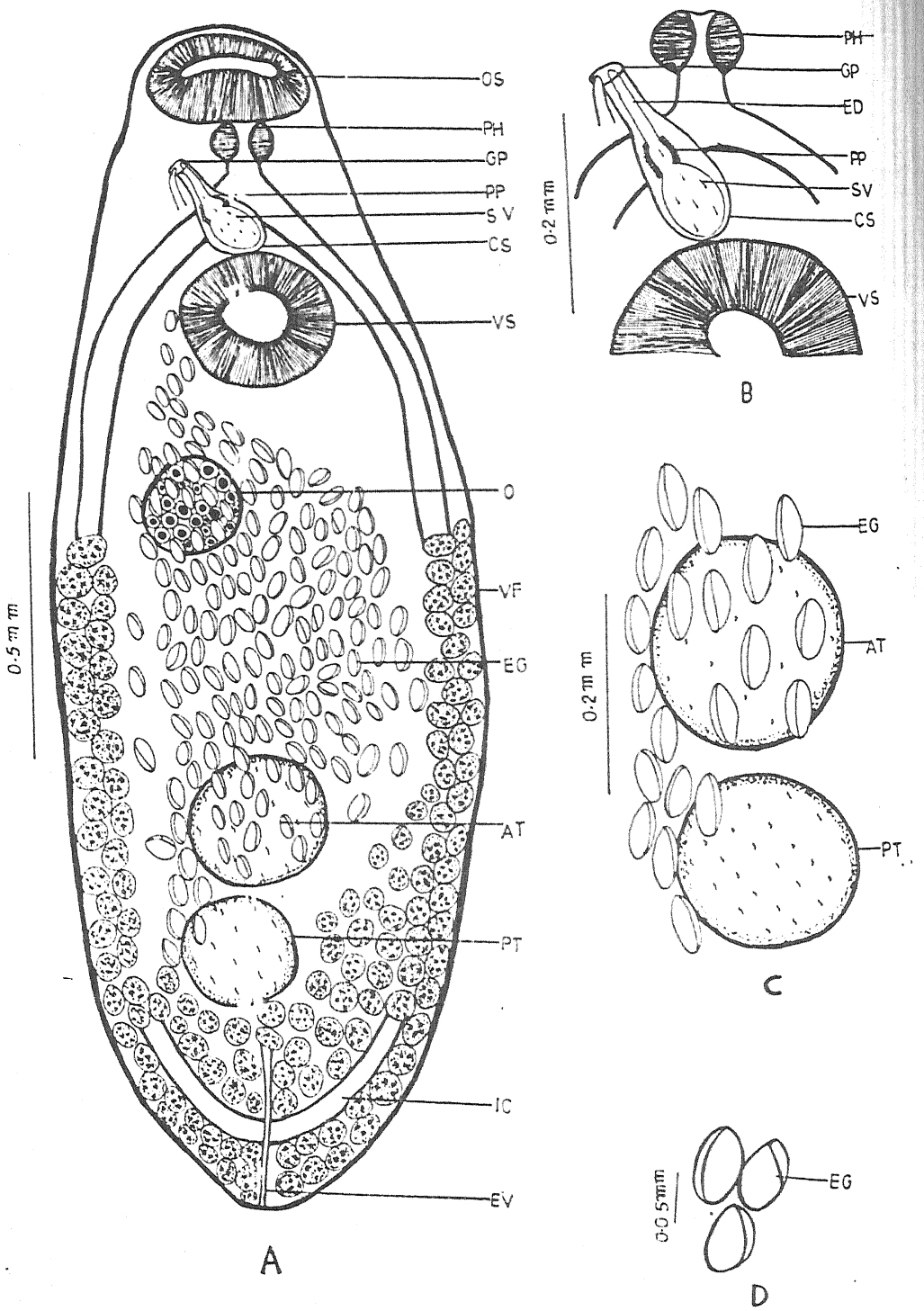
## Measurements

Body length 2.20, width 0.78; oral sucker 0.165 x 0.295; ventral sucker 0.250 x 0.270; pre-pharynx absent; pharynx 0.07 x 0.11; oesophagus 0.025 x 0.060; anterior testis 0.240 x 0.250; posterior testis 0.20 x 0.21; cirrus sac 0.220 x 0.100; vesicula seminalis 0.085 x 0.070; pars prostatica 0.035 x 0.055; ejaculatory duct 0.085 x 0.020; ovary 0.185 x 0.185; receptaculum absent; egg 0.055 x 0.035.

## Discussion

The present form belongs to genus Nicalla Wisniewski, 1934, it closely resembles with N. halichoeri Overstreet, 1969 but differs from it absence of pre-pharynx. Short oesophagus in the position, shape and size of testes and in the extension of vitelline follicles. These characters have been considered as individual variations and first time recorded this host.

# PLATE - 28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Nicolla halichoeri Overstreet, 1969

(Plate No. 28)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac (drawn from live specimen).

Fig. C. A part of body showing testis (drawn from live specimen).

Fig. D. Egg enlarged.

## *Nicolla indica* Srivastava, 1968

(Plate No. 29)

| | | |
|---|---|---|
| Host | : | *Rita rita* (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Kanpur |
| No. of fish examined | : | 300 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 3 |

### Description

Body elongated, smooth, rounded both ends. Oral sucker subterminal, sphericalor, subspherical. Ventral sucker subspherical, pre-equatorial, larger than oral sucker. Pre-pharynx absent. Pharynx rounded, muscular. Oesophagus short or long. Intestinal caeca united near posterior end of body.

Testes tandem or oblequily tandem, oval or rounded, post-equatorial, equal. Cirrus sac long extending from genital pore up to anterior end of ventral sucker. Vesicula seminalis bipartite. Pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct narrow long. Ovary oval, or rounded, equatorial, pretesticular, post acetabular. Receptaculum seminis, preovarian. Vitelline follicles extending from level of oesophagus up to posterior end of

body. Uterus arises from ootype, extending anteriorly and opens at genital pore. Egg large, operculated. Genital pore extra caecal, at the level of posterior end of oralsucker.

Excretory bladder tubular, extend up to testes, excretory pore terminal.

## Measurements

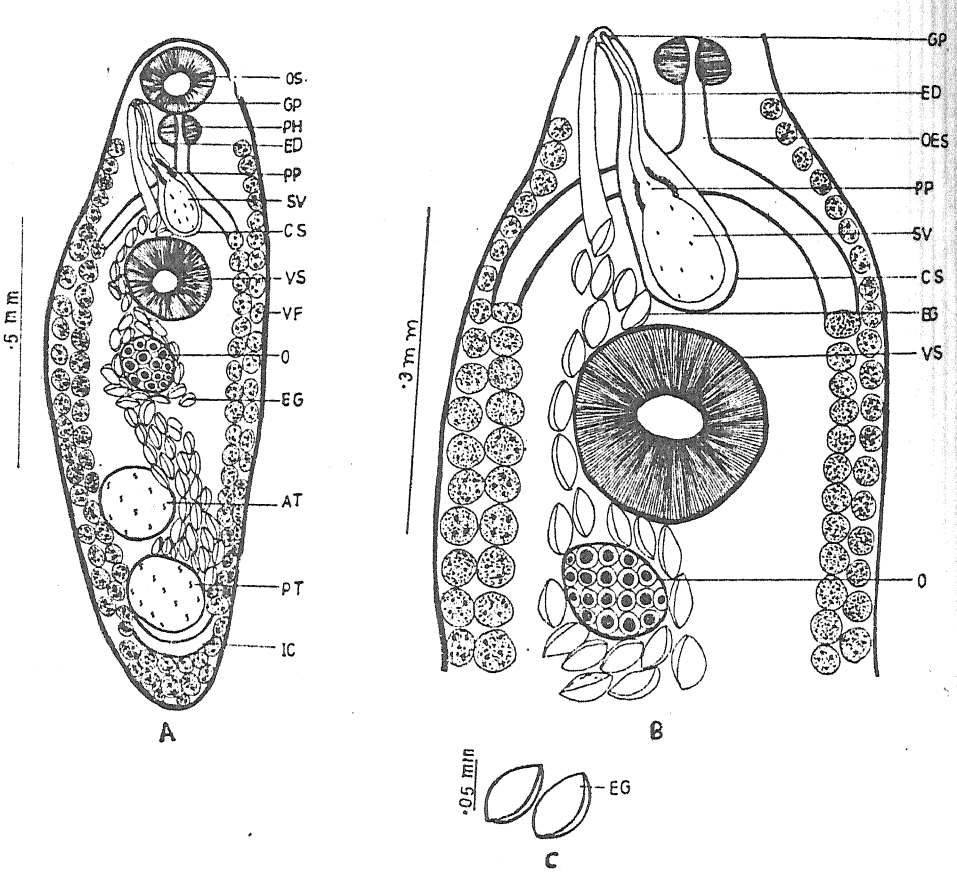
Body length 1.33, width 0.43; oral sucker 0.125 x 0.140; ventral sucker 0.180 x 0.155; pre-pharynx absent; pharynx 0.055 x 0.04; oesophagus 0.05 x 0.025; anterior testis 0.145x 0.140; posterior testis 0.160 x 0.135; cirrus sac 0.290 x 0.060; vesicula seminis 0.110 x 0.060; pars prostatica 0.050 x 0.020; ejaculatory duct 0.115 x 0.010; ovary 0.115 x 0.105; receptaculum seminis absent; egg 0.050 x 0.025.

## Discussion

The present form belongs to genus Nicolla Wisniewski, 1934. It closely resembles with N. indica Srivastava, 1968 but differs from it, in the absence of pre-pharynx, size and shape of testes, in the position of ovary, in the extention of cirrus sac and opening of genital pore.

These characters have been considered as individual variations. It is added as an additional host.

# PLATE - 29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Nicolla indica Srivastava, 1968

(Plate No. 29)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac, ventral sucker, ovary etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

## Neopeeoelina fotedari n.sp.*

(Plate No. 30)

| | | |
|---|---|---|
| Host | : | Mystus vitattus (Cuv. & Bloch.) |
| Location | : | Intestine |
| Locality | : | Fish market Ghatampur |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 4 |

### Description

Body elongated, smooth, bluntly rounded anterior and tappering posterior ends. Oral sucker sub-terminal, oval or spherical. Ventral sucker pre-equatorial, rounded or oval and larger than oral sucker. Pre-phrynx absent. Pharynx spherical, muscular. Oesophagus long. Intestinal caeca reaching up to the posterior end of body and opens in to the excretory vesicle, near the excretory pore in a common atrium. Testes rounded or oval, tandem or oblequily tandem, anterior testis just post. mid equatorial region of body. Cirrus sac large, oval, sac like. Vesicula seminalis short. Pars prostatica, surrounded by

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* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology".

number of prostate gland cells. Small ejaculatory duct, cirrus not visible. Ovary oval or rounded, equatorial, pre-testicular near left side of ventralsucker. Oviduct arises anterior side of ovary, opens at the ootype. Receptaculum seminis oval, lying anterior to the ovary, small Laurer's canal opens at ootype near the opening of receptaculum seminis. Large number of small mehlis gland cells surrounded the ootype. Uterus limited extend not beyond anterior testis and opens through a short metraterm at genital pore. Egg oval, operculated. Genital pore median below the intestinal bifurcation. Vitelline follicles large, extend up to the middle level of ventral sucker to posterior end of body. Two vitelline ducts unite to form a vitelline reservoir, opens at ootype through a vitelline duct. Excretory bladder long, tubular, extending behind posterior testis to the posterior end of the body, opens out side through an atrium.

## Measurements

Body length 2.475, width 0.560; oral sucker 0.240 x 0.230; ventralsucker 0.255 x 0.215; pre-pharynx absent; pharynx 0.05 x 0.08; oesophagus 0.11 x 0.025; anterior testis 0.125 x 0.125; posterior testis 0.105 x 0.105; cirrus sac 0.145 x 0.095; vesicula seminalis 0.040 x 0.065; pars

prostatica 0.050 x 0.055; ejaculatory duct 0.045 x 0.015; ovary 0.140 x 0.140; receptaculum seminis 0.16 x 0.08; egg 0.115 x 0.050.

## Discussion

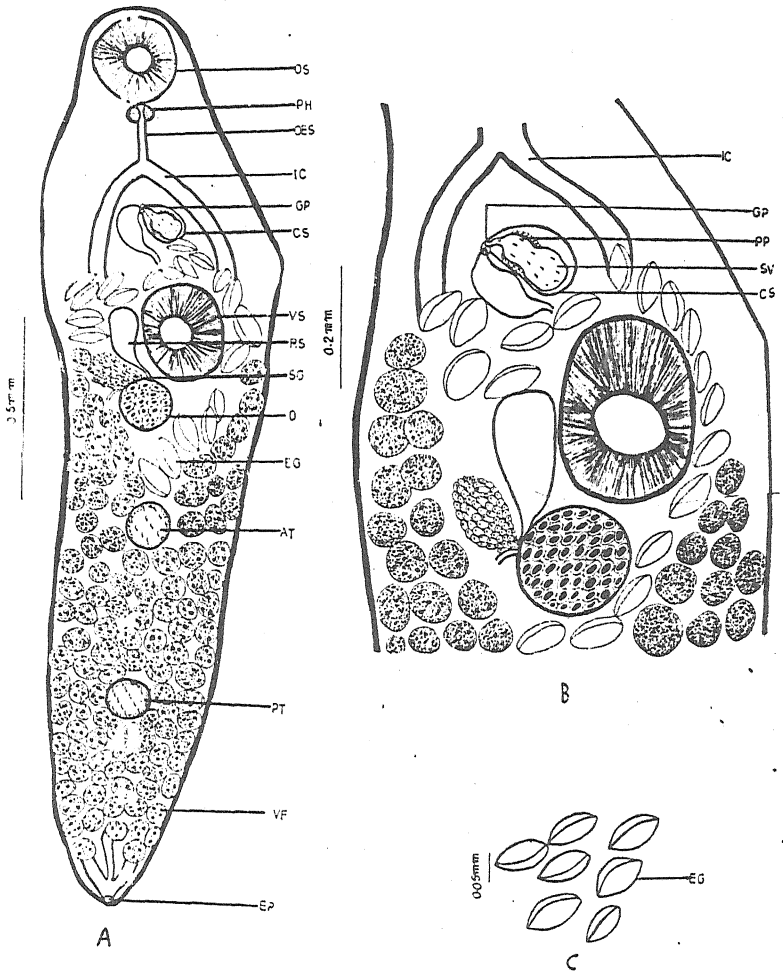
Gupta (1955) established the genus Neopecoelina with N. saharanpurensis for a worm collected from the intestine of Macrones cavasius (Ham.) and Heteropneustes fossilis (Bloch.) Gupta (1955) also described Lucknoides cavasiusi, another new genus, from the intestine of Macrones cavasius (Ham.). Yamaguti (1958) has pointed out the resemblance between the above two genera and has considered Lucknoides as a synonym of Neopecoelina and named Lucknoides cavasius Gupta, 1955 as N. cavasiusi (Gupta, 1955) Yamaguti, 1958. The writer also agrees with Yamaguti (1958) on this issue and regards Lucknoides as synonym of Neopecodina. Thus so far only three species are reported under the genus Neopecoelina viz., N. saharanpurensis Gupta, 1955, and N. cavasiusi (Gupta, 1955) Yamaguti, 1958 and N. punctatusi Agrawal and Agarwal, 1980.

Present form closely resembles with N. punctatus but differs from it in the position of ovary, position of testes, and in the size of oral sucker, which is smaller than the

ventralsucker. It is therefore, regarded as new species N. fotedarai n.sp.

The new species is named in the honour of Dr. D.N. Fotedar, Professor and Head, P.G. Department of Zoology, University of Kashmir, Srinagar, Jammu and Kashmir.

# PLATE - 30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Neopeeoelina fotedarai n.sp.*

(Plate No. 30)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing position of cirrus sac, ventral sucker, ovary, receptaculum seminis etc. enlarged (drawn from live specimen).

Fig. C. Eggs enlarged.

## *Neopeecoelina chandailai* n.sp.*

(Plate No. 31)

| | | |
|---|---|---|
| Host | : | *Mystus vitattus* (Cuv. & Bloch.) |
| Location | : | Intestine |
| Locality | : | Fish market Ghatampur |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 3 |
| No.of specimen collected | : | 10 |

### Description

Body elongated,smooth, rounded anterior and tappering. Posterior end. Oral sucker subterminal, rounded or oval. Ventral sucker just pre-equatorial, spherical or rounded, slightly smaller than the oval sucker. Pre-pharynx absent. Pharynx spherical muscular. Oesophagus short. Intestinal caeca reaching up to posterior end of body, opens in to excretoryvesicle near the excretory pore in common atrium. Testes oval oblequily tandem post equatorial, anterior testis larger than posterior testis. Cirrus sac large oval, sac like, between intestinal bifurcation, encloses. Oval and massive

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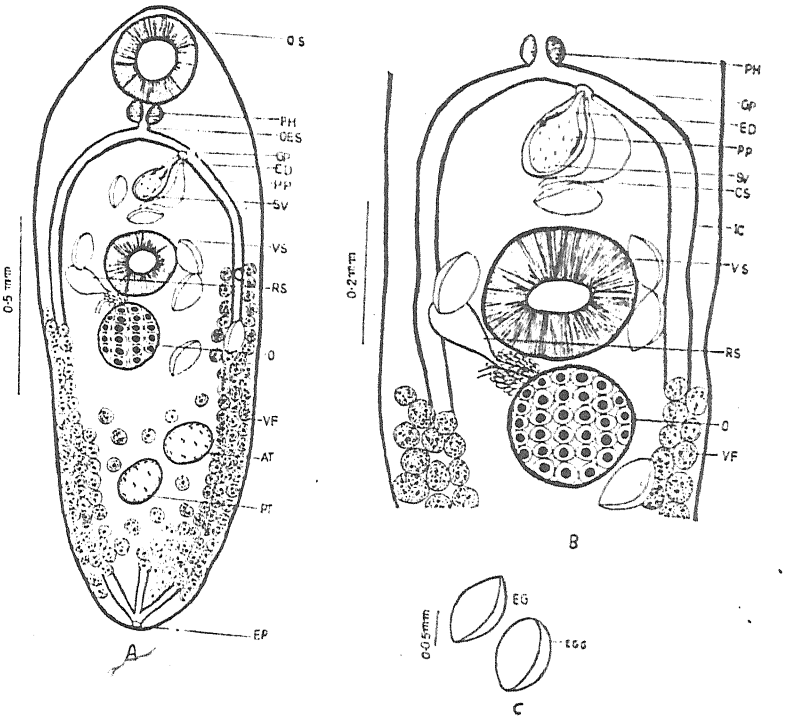
* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology.

vesicula seminalis, a short pars prostatica, surrounded by number of prostate gland cells. Small ejaculatory duct present. Ovary oval or rounded, equatorial, pre-testicular. Oviduct arises from anterior side of the ovary, opens at the ootype. Receptaculum seminis oval, situated anterior to the ovary. A smaller Laurer's canal opens at ootype, near the opening of receptaculum seminis. Large number of small Mehlis gland cells surrounded the ootype. Uterus limited extends not beyond anterior testis and opens through a short metraterm at genital pore. Eggs oval, operculated. Genital pore situated at the right side of intestinal caeca. Vitelline follicles large, extend up to the middle of ventral sucker to posterior end of body. Two vitelline duct unite to form a vitelline reservoir, opens at ootype through a common vitelline duct. Excretory bladder long tubular, extending behind posterior testis to posterior end of body, opens out side through an atrium.

Measurements

Body length 1.72, width 0.60; oral sucker 0.25 x 0.24; ventralsucker 0.180 x 0.195; pre-pharynx absent; pharynx 0.065 x 0.10; oesophagus 0.02 x 0.35; anterior testis, 0.140 x 0.110; posterior testis 0.140 x 0.10; cirrus sac 0.185 x 0.070; vesicula seminalis 0.07 x 0.045; pars prostatica 0.035 x 0.030; ejaculatory duct, 0.06 x 0.01; ovary 0.185 x 0.165;

# PLATE - 31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Neopecoelina chandailai n.sp.*

(Plate No. 31)

Fig. A. Entire worm.

Fig. B. A half part of body showing cirrus sac position of ovary and ventralsucker etc. enlarge (drawn from live specimen).

Fig. C. Eggs enlarged.

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FAMILY : PARAMPHISTOMIDAE

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## Pseudoorientodiscus sengurai n.sp.*

(Plate No. 32)

| | | |
|---|---|---|
| Host | : | Puntius sarana (Ham.) |
| Location | : | Intestine |
| Locality | : | Fish market Ghatampur |
| No. of fish examined | : | 350 |
| No. of fish infected | : | 1 |
| No.of specimen collected | : | 8 |

### Description

Body elongated, smooth, narrow anterior and broad posterior end. Oral sucker terminal, spherical or rounded, oral pouch long, anteriolateral to oral sucker. Ventralsucker spherical or rounded larger than oral sucker, muscular situated at posterior end of body. Pre-pharynx and pharynx are absent. Oesophagus short thick, oesophageal bulb well developed, muscular. Intestinal caeca terminating up to the anterior level of ventral sucker. Testes entire, spherical or rounded intercaecal, tandem, equatorial, anterior testis larger than posterior testis. Cirrus sac sigmoid, post

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* A full length paper on this species has been accepted for publication in the journal "Indian Journal of Helminthology.

bifurcal, pre-equatorial, vesicula seminalis bipartite, pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct small. Genitalsucker surrounded the genitalpore, large sub-spherical. Ovary oval, rounded, post-testicular, pre-acetabular, at the level of posterior end of intestinal caeca. Receptaculum seminis absent. Vitelline follicles extending from oesophagealregion up to middle region of ventral sucker at posterior end of body. Uterus arises from ootype, intercaecal and extracaecal, running on lateral side of body up to hind end then terns anteriorly to open at genital pore. Egg ovoid, large, operculated. Genital pore behind intestinal bifurcation surrounded by genitalsucker. Excretory bladder not seen.

Measurement

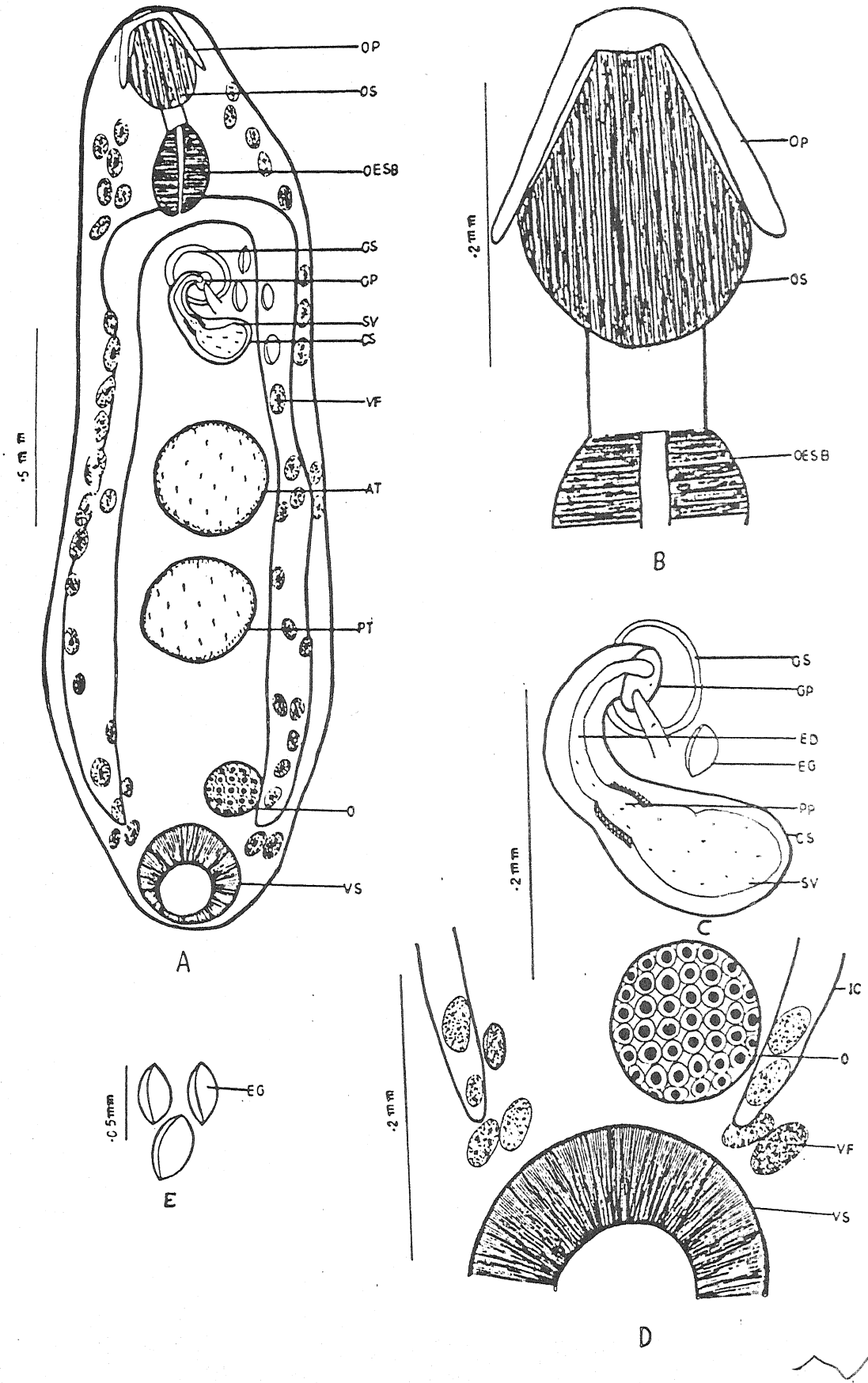
Body length 2.275, width 0.645, oral sucker 0.245 x 0.180; ventral sucker 0.245 x 0.285; oesophageal bulb 0.22 x 0.14; anterior testis 0.280 x 0.280; posterior testis 0.250 x 0.285; cirrus sac 0.375 x 0.080; vesicula seminalis 0.125 x 0.075; pars prostatica 0.045 x 0.020; ejaculatory duct 0.150 x 0.025; ovary 0.125 x 0.135; receptaculum absent; egg 0.070 x 0.035.

## Discussion

The present form belongs to genus Pseudoorientodiscus Agrawal and Sharma, 1989. It differs from the known species P. laximibaii in the position and size of the ovary, in the shape and size of testes, in the extention of intestinal caeca which is anterior margin of posterior sucker and in the extention of vitelline follicles from oesophagealllevel to middle level of the posterior sucker.

Therefore, a new species P. sengurai n.sp. The new species is formed for its reception. The new species is named after the name of the river from which the host is collected.

# PLATE - 32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Pseudoorientodiscus sengurai n.sp.*

(Plate No. 32)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing oral sucker and oesophageal bulb enlarged (drawn from live specimen)

Fig. C. Cirrus sac enlarged (drawn from live specimen).

Fig. D. A part of posterior end of body showing position of ovary enlarged (drawn from live specimen).

Fig. E. Egg enlarged.

## KEY TO LETTERING IN FIGURES

| | |
|---|---|
| AS | Anterior sucker |
| AT | Anterior testis |
| CS | Cirrus sac |
| EB | Excretory bladder |
| ED | Ejaculatory duct |
| EG | Egg |
| EP | Excretory pore |
| GP | Genital pore |
| GS | Genital sucker |
| I | Intestine |
| IC | Intestinal caecum |
| O | Ovary |
| OES | Oesophagus |
| OESB | Oesophageal bulb |
| OP | Oral pouch |
| OS | Oral sucker |
| PG | Prostate gland cells |
| PH | Pharynx |
| PP | Pars prostatica |
| PPH | Prepharynx |
| PT | Posterior testis |
| RS | Receptaculum seminis |
| SP | Spines |
| SV | Vesicula seminalis |
| T | Testis |
| TEN | Tentacle |
| U | Uterus |
| VF | Vitelline follicles |
| VFD | Vitelline follicular duct |
| VS | Ventral sucker |

## KEY TO LETTERING IN FIGURES

| | |
|---|---|
| AS | Anterior sucker |
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| I | Intestine |
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| O | Ovary |
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| OP | Oral pouch |
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# SUMMARY

## SUMMARY

Fish are the main source of Protein, Vitamins, Fat and large amount of calcium, phosphorous, oil and other elements. Fishes are delicious and easily digestable. Fish meals contains 13 to 30% protein provides 300 to 1600 calories energy and have a good taste. Therefore, a lare number of fresh water brankish and marine fishes are regularly captured, in various part of the world. Only in India 7.5 millions people depend on fish and fishery while twenty fifth thousand peoples are engased in ancillary vocation, such as net, basket, and ice making, fish-processing and transportation etc. Specially trematodes as a whole are considered one of the major groups of Helminth parasites infesting fishes. There is also great diversity among the digenetic trematodes. The classification of large number of species is unsettled, and our knowledge is still in complete, even in regards to the adult trematodes and more inadequate in regards to their life cycle and larval stages from time to time. Indian workers have worked out the trematode fauna of fishes in various regions of the country. Therefore, district Kanpur rivers, reservoirs pond fishes were examined for helminth fauna. Though a collection of trematodes, cestodes, nematodes and acanthoce-

phalans has been made but in the present thesis studies on the digenetic trematode parasites only are being presented.

The present thesis entitled "Helminth parasites (Digenia, Trematoda) of fresh water fishes of district Kanpur", efforts have been made to study the morphology and taxonomy of digenetic trematodes infesting the fresh water fishes of Kanpur region, particularly the place, Pokhrayan, Ghatampur, Kanpur Nagar. The survey has been carried out from Feb. 1990 to October 1993. The thesis includes the description of 32 species of which 18 are new to the science (including one subgenus) and 14 are redescribed and added valuable interspecific characters. The observation have been supported by 32 Camera Lucida sketches. the description of each new species has been followed by a discussion for establishing the claim of its being new. Futher a general Introduction, Historical Review, Material and Method, and Host Parasite list are given in the beginning of thesis. A list of references consulted during the course of present investigations has been given in the last. A check list of digenetic trematodes of fresh water fishes of India is appended at the end of thesis. The cover page including a map of district Kanpur showing various localities surveyed for trematode fauna of fresh water piscine host.

The author is responsible for all the observations diagrams included in the thesis.

Family : Allocreadiidae

Subfamily : Allocreadiinae

Allocreadium duknwai - Agrawal and Sharma 1989

It has been obtained from Rita rita (Ham.) from fish market Kanpur and redescribed. It differs from the original description in having long oesophagus in the size of suckers and extention of vitelline follicles and also in the relative size of various organs. These characters are considered as individual variation.

Allocreadium fasciatusi Kakaji, 1969

It has been obtained from Tor tor (Ham.) purchased from fish market Kanpur and redescribed. It differs from the original from the original description in the ratio and size of ventral and oral suckers in the absence of pre-pharynx and oesophagus size and position of ovary, presence of receptaculum seminis, extention of uterine coil and the extention of vitelline follicles. These characters have been considered as individual variation. For the first time being reported from additional host.

Allocreadium handiai Pande, 1937

It has been obtained from Mystus vittatus (Cuv. & Bloch) purchased from fish market Kanpur and redescribed. It differs from in having posterior testis smaller than anterior testis. Cirrus sac elongated, extending anterior to ventral sucker up to post pharyngial have long ejaculatory duct. Ovary post acetabular, equatorial, in the relative size of various organs. These characters have been considered as individual variation. It is added as an additional host.

Allocreadium kosia Pande, 1937

It has been obtained from Tor tor (Ham.) purchased from fish market Kanpur and redsescribed. It differs from size and position of ventral suckers, in the position and shape of testis, anterior testis larger than posterior testis, shape and size of receptaculum seminis. Vitelline follicles extendup pharyngeal region to hind end of body and also in the relative size of various organs. These characters are considered as individual variations.

Allocreadium isoporum Looss 1894

It has been obtained from Rita rita (Ham.) purchased at fish market Kanpur and redescribed. It differs from the original description in the presence of oesophagus, in the

position of testes, in the size and position of ovary, in the position of receptaculum seminis and extention of vitelline follicles, and also in the relative size of various organs. These characters are considered as individual variations.

Allocreadium nicolli Pande, 1937

It has been obtained from Rita rita (Ham.) purchased from fish market at Kanpur and redescribed. It differs from the original description in the presence of oesophagus, absence of prepharynx, in the position of cirrus sac, opening of genital pore, in the position of ovary and in the relative size of various organs. These characters have been considered as individual variation.

Allocreatium thaprai Gupta, 1950

It has been obtained from Barbus sophor (Ham. & Day) from fish market Kanpur and redescribed. It differs from the position and opening of genital pore in the size and shape of receptaculum seminis in the extention of uterus in the relative size of various organs. These characters have been considered as individual variations. It is added as an additional host.

Family : Apocreadiidae

Subfamily : Apocreadiinae

Apocreadium maxicanum Manter, 1937

It has been obtained from Barbus sarana (Ham. & Buch.) purchased from fish market Kanpur and redescribed. It closely resemble with A. maxicanum Manter 1937 but differs from it in having long or short oesophagus, in the position of cirrus sac, in the position and shape of testes, and in the extention of vitelline follicles and relative size of the various organs.

Family : Bucephalidae

Subfamily : Bucephalinae

Bucephalus Kanpurensis n. sp.

It has been obtained from Bagarilus bagarius (Ham. & Skyes) purchased on river bank of Ganga. It differs from 18 species of the Genus Bucephalus Bear 1926 are reported from India. The present form differs from all the known species in the presence of long tubular oesophagus, shape of intestine except B. allahabadensis shape and position of testes, in the position of ovary intertesticular and in the number of vitelline follicles.

The present form closely related to the B. gangaticus and

B. elacatus in the extention and position of the intestine, in the shape and extention of cirrus sac, it also closer to B. indica, B. elacatus, B. aoria in the number and shape of tentacles. It differs from B. vinodi n.sp. also in which body is aspinose and relative size of various organs.

Bucephalus vinodi n.sp.

It has been obtained from Bagarius bagerious (Ham. & Skyes) purchased on river bank of Ganga. It differs from 17 species of the Genus Bucephalus Bear, 1926 are reported from India. The present form differs from all the known species in the presence and shape. Number of tentacles which are bifurcated at the tip, in the extention of vitelline follicles, except in B. allahabadensis.

It is closer to B. allahabadensis, B. bagarius, B. tritentacularia, B. elacatus but differs in the position of cirrus sac and in the position of testes.

It further differs from B. chillene, B. allahabadensis, in the shape of the intestine. It also differs from B. indicus, in the shape of egg and from B. barina, B. bhoratica in the shape and position of cirrus sac and relative size of various organs.

Family : Bucephalidae

Subfamily : Prosorhynchinae

Prosorhynchoides garvai Verma, 1936

It has been obtained from Barbus sophor (Ham. & Day.) purchased fish market Kanpur and redescribed. It differs from in the presence of spines half region of the body in the presence of long tubular oesophagus. Testes tandem, symmetrical, unequal, situated left and right side in the position of overy in the receptaculum seminis sac like, small, Laurer's canal present. These features appears to be individual variations.

Prosorhynchoides karvei Bholerao, 1937

It has been obtained from Barbus sophor (Ham. and Day.), purchased fish market Kanpur and redescribed differs from in the presence of spines on the body up to cirrus sac region in the absence of oesophagus, in the shape of seminal vesicle, and in the shape and size of anterior testis. These features appears to be individual variation.

Family : Dicrocoeliidae

Subfamily : Neodicrocodiinae

Neodicrocoelium nirupmai n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.)

purchased from fish market Kanpur. It differs from known species in the presence of spines on the oral sucker, in the presence of prepharynx, by having long tubular oesophagus, in the presence of parellel testes and pairing to each other. Vitelline follicles extending from anterior to posterior ends and relative size of various organs.

Family : Hemiuridae

Subfamily : Macradenininae

Macradenina mestacembeli n.sp.

It has been obtained from Mestacembelus armetus (Lac.) purchased from fish market Kanpur. It differs from other known species in the absences of prepharynx and oesophagus position and size of ventral suckers in the position and size of testes in the shape and position of ovary and in the extention of uterus and relative size of various organs.

Macradenina thaprai n.sp.

It has been obtained Mastacembelus armetus (Lac.) from fish market Kanpur. It differs from known only two species in the absence of prepharynx and oesophagus, in the position, shape and size of testes, in the extention and position of cirrus sac, in the opening of genital pore in the shape of

ovary, in the position and size of receptaculum seminis, in the number of vitelline follicles and relative size of organs.

Family : Monarchiidae

Subfamily : Ancylocoeliinae

Ancylocoelium ritai n.sp.

It has been obtained from Rita rita (Ham.) purchased from fish market Kanpur. It differs from known species (only one species is known) by having smooth body, prepharynx long tubular, pharynx prominent muscular. Oesophagus short, intestinal caeca thick V-shaped extend in pre equatorial region or above the ventral suckers. In the position of ovary which is closer to posterior end of ventral sucker in having receptaculum seminis between ovary and anterior testis and relative size of organs.

Family : Opisthorchiidae

Subfamily : Opisthorchiinae

Opisthorchis pedicellata Verma, 1927

It has been obtained from Bagarius bagarius (Ham. & Skyes.) purchased from fish market Kanpur and redescribed. It differs from original description in the ratio of suckers, position of oral sucker which is terminal, in the presence of prepharynx, oesophagus very short or absent., in the extension

of vesicula seminalis from post equatorial of body up to just above the anterior end of ventral sucker and relative size of various organs.

Family : Opistholebetudae

Subfamily : Pycnadeninae

Pycnadena pokhrayansis n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.) from fish market Kanpur. The present form differs all the known species in the position of testes which is equatorial, post acetabular more or less parellel to each other, in the position of ovary which is preacetabular, preequatorial and in the size of eggs and relative size of various organs.

Family : Opecoelidae

Subfamily : Opecoelinae

Neopodocotyle laxmibaii n.sp.

It has been obtained from Labio rohita (Ham.) from fish market Kanpur. It differs from all the known species in the ratio and size of oral sucker and ventral sucker, in the size of posterior testis and in the extension of vitelline follicles, in the position of genital pore it also differs from N. mehrai in the size of oesophagus from N. dayali in the

position of cirrus sac and form N. chauhani, in the shape of the ovary and for the first time L. rohita is added as an additional host and relative size of various organs.

Neopodocotyle hanumanthai n.sp.

It has been obtained Labio rohita (Ham.) from fish market Kanpur. It differs from eight species of the subgenus Neopodocotyle Dayal, 1944, N. spinopora, N. mehrai, N. balliansis, N. dayali in the extension of cirrus sac, size of posterior testis, in the size of ventral sucker and in the opening of genital pore by having short oesophagus and in the extension of vitelline follicles and it differs from N. laxmibaii in the size of oesophagus in the ratio of ventral and oral suckers, in the position of ovary, inthe shape of the testes in the extension of vitelline follicles and relative size of various organs.

Family : Opecoelidae

Subfamily : Plagioporinae

Podocorchis gangi n.subgenus, n.sp.

It has been obtained from Channa marulius (Ham. & Buch.) from fish market Kanpur. It differs from genus Podocotyle in the position of genital pore, marginal extracaecal at the oesophagial or middle of oral sucker level, and in the

position of cirrus sac submedian, bifurcal, preacetabular, marginal extend up to the anterior margine of ventral sucker, to oral sucker.

Podocorchis maruli n.sp.

It has been obtained from Channa marulius (Ham. & Buch.) from fish market Kanpur. It differs from known species P. gangi in the position and size of cirrus sac, in the position of genital pore, in the size of ovary and shape of testes and relative size of various organs.

Podocorchis vittatusi n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.) from fish market Kanpur, it differs from new species P. maruli in having large oral sucker than ventral sucker in the shape and position of testes in the extension of vitelline follicles and in the size of eggs which are embryonated and relative size of various organs.

Family : Opecoelidae

Subfamily :

Eucreadium satpalai n.sp.

It has been obtained from Oxygaster bacaila (Ham.) from fish market Kanpur. It differs only six known species in the

absence of prepharynx and oesophagus in the extension of vitelline follicles in the extension of massive thick rinkled intestinal caeca, in having entire testes except E. gangi and relative size of various organs.

Family : Opecoelidae

Subfamily : Opecoelinae

Nicolla chauhani n.sp.

It has been obtained from Mastacembelus armetus (Lac.) purchased from fish market Kanpur. It differs from 10 known species in having oral sucker larger than ventral sucker, in the position of the ovary in the size of eggs and in the position of testes which are more or less equatorial region and relative size of various organs.

Nicolla dayali n.sp.

It has been obtained from Rita rita (Ham.) purchased from fish market Kanpur. It differs from eleven known species in the presence of spines only in oral sucker region, in the presence of oesophagus, in the position and size of testes, in the extension of vitelline follicles, cirrus sac up to preacetabular and relative sized various organs.

Nicolla skrijabini (Iwanitzky, 1928) Wisniewski, 1933

It has been obtained from Rita rita (Ham.) from fish market Kanpur and redescribed. It closely resemble N. skrijabini but differs from it in the extension of cirrus sac, in the extension of vitelline follicles and in the position of genital pore and relative size of various organs.

Nicolla halichoeri Overstreet, 1969

It has been obtained Rita rita (Ham.) purchased from fishmarket Kanpur. It closely resembles but differs from it in the absences of prepharynx, short oesophagus, in the position shape and size of testes in the extension of vitelline follicles and relative size of various organs and the first time recorded this host.

Nicolla indica Srivastva, 1968

It has been obtained from Rita rita (Ham.) purchased from fish market Kanpur. It closely resembles with N. indica but differs from it, in the absence of prepharynx size and shape of testes, in the position of ovary, in the extension of cirrus sac, in the opening of genital pore and relative size of various organs. It is added as an additional host.

Family : Opecoelidae

Subfamily : Opeodinae

Neopecoelina fotedarai n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.) purchased from fish market Ghatampur. Present form differs from all known species in the position of ovary, in the position of testes in the size of oral sucker which is smaller than the ventral sucker, in the position and size of receptaculum seminalis and relative size of various organs recorded as an additional host.

Neopecoelina chandailai n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.) purchased from fish market Ghatampur. The present form differs from all the known species in the position of genital pore, in the position of testes which are digonally tandem at post equatorial region in the size of ovary and in the size extension of vitelline follicles and relativ size of various organs Mysttus vittatus (Cuv. & Bloch.) is recorded as an additional piscine host.

Family : Paramphistomidae

Subfamily : Orientodiscinae

Pseudoorientodiscus sengurai n.sp.

It has been obtained from Puntius sarana (Ham.) purchased from fish market Ghatampur. It differs from the known species P. laximibaii in the position and size of the ovary, in the shape and size of testes, in the extension of intestinal caeca which is anterior margin of posterior sucker, in the extension of vitelline follicles from oesophageal level to middle level of the posterior sucker and relative size of various organs.

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# CHECK LIST OF

# DIGENETIC TREMATODES OF FRESH WATER FISHES OF INDIA

A Check list of Digenetic trematodes of fresh water fishes of India

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| Order:Actinoptergii | | | |
| Family: Gobiidae (Cuv.) | | | |
| Gobius giuris (Cuv. & Val.) | Isopororchis hypsclobagari | Bhalerao, 1936 | Hyderabad |
| | Opegaster beliyai | Pande, 1937 | Allahabad |
| | Allocreadium nicolli | Pandey, 1938 | Allahabad |
| | Phyllodistomum (Catroptoides) paraorchium | Jaiswal, 1957 | Hyderabad |
| Family: Labyrinthioi (Cuv.) | | | |
| Anabus testudinus (Ham.) | Allocreadium manteri | Gupta & Puri, 1980 | Lucknow |
| | Pleurogenoides anabasi | Agarwal & Kumar, 1983 | Varanasi |
| Colisa (Trichogaster) fasciatus (Bl.& Schn.) | Clinostomum piscidium | Southwell & Prashad, 1918 | Poona |
| | Diplostomum elongatus | Singh, 1957 | Lucknow |
| | Allocreadium fasciatusi | Kakaji, 1969 | Lucknow |
| | Eucreadium gangi | Pandey, 1970 | India* |
| Family: Nandiadae Gunther | | | |
| Nandus nandus (Ham.) | Clinostomum piscidicum | Southwell & Prashad, 1918 | Poona, Bengal |
| | Coitocaecum orientalis | Dwivedi, 1970 | Jabalpur |
| | Transversotrema chauhani | Agarwal & Singh, 1981 | Lucknow |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| Family: Ophiocephalidae (Bleeker) | | | |
| Channa (Ophiocephalus) gachua (Ham.& Buch.) | Isoparorchis hypselobagri | Bhalerao, 1936 | Hyderabad |
| Channa (Ophiocephalus) marulius (Ham.& Buch) | Isoparorchis hypselobagri | Bhalerao, 1936 | Hyderabad |
| | *Phyllodistomum sp. | Bhalerao, 1937 | Poona |
| | Euclinostomum channai | Jaiswal, 1957 | Poona |
| | Azygia marulii | Jaiswal & Narayan, 1971 | *India |
| | Azygia papillata | Ubgade & Agarwal, 1980 | Raipur |
| | Paradictynogryptus jhansiensis | Agrawal & Sharma, 1989 | Jhansi |
| Channa (Ophiocephalus) punctatus (Bloch.) | Genarchopsis piscicola (Syn. Progonus piscicola) | Srivastava, 1933 | Allahabad |
| | Allocreadium handiai | Pande , 1934 | Allahabad |
| | Isoparorchis hypselabagari (Syn.Genarchopsis) Progonus piscicola) | Bhalerao, 1936 | Hyderabad |
| | Asymphylodora indica | Srivastava, 1936 | Allahabad |
| | Orientocreadium (Nizamia) hyderabadi | Dayal, 1938 | Hyderabad |
| | *Clinostomum sp. | Srivastava, 1950 | Allahabad |
| | Genarchopsis (Ophiocorchis) indicus | Gupta, 1951 | Lucknow & Saharanpur |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Genarchopsis (Ophiocorchis) dasus | Gupta, 1951 | Saharanpur |
| | Orientocreadium (Ganadotrema) phillipai | Gupta, 1951 | Lucknow & Saharanpur |
| | Brahmputrotrema punctata | Gupta, 1955 | Assam |
| | Euclinostomum channai | Jaiswal, 1957 | Hyderabad |
| | Eclinostomum heptacaecum | Jaiswal, 1957 | Hyderabad |
| | Allocreadium ophiocephali | Srivastava, 1960 | Raipur |
| | Azygia asiatica | Simha & Prashad, 1964 | Vishakhapatnam |
| | Genarchopsis punctati | Agarwal, 1966 | Lucknow |
| | Derogenes hyderabadensis | Jaiswal, 1967 | Hyderabad |
| | Brahmputrotrema batesia | Dwivedi, 1970 | Jabalpur |
| | Orientocreadium batrachoides | Pandey, 1972 | Lucknow |
| | Jamunatrema indica | Lal, 1974 | Patna |
| | Haplorchoides pearsoni | Pandey & Shukla, 1976 | Lucknow |
| | Hemipera ovocaudata | Nama, 1978 | *India |
| | Neopodocotyle kulparensis | Agarwal & Agrawal, 1980 | Kulpahar District Hamirpur |
| | Genarchopsis avitellarium | Varma & Sahay, 1983 | Ranchi |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Eucreadium kulparensis | Agarwal & Agrawal, 1984 | Kulpahar District Hamirpur |
| | Hysteroleitha ophiocephalis | Mehra, Kharoo & Dhar, 1984 | Allahabad |
| Channa (Ophiocephalus) striatus (Bloch) | Isoparorchis hypselobagri | Bhalerao, 1932 | Nagpur |
| | Genarchopsis (Ophiocorchis) | Srivastava, 1933 | Allahabad |
| | Genarchopsis singularia | Srivastava, 1933 | Allahabad |
| | Clinostomum macrosomium | Jaiswal, 1957 | Hyderabad |
| | Azygia stunkardi | Rai, 1964 | Jabalpur |
| Family: Percidae (Cuv.) | | | |
| Ambasis nama (Cuv.& Val.) | Isoparorchis hyselobagri | Bhalerao, 1936 | Poona |
| | Briendralabes krishnakanti | Srivastava & Ghosh, 1967 | Dhakuria Lake, Calcutta |
| | Allocreadium manteri | Gupta & Puri, 1980 | Lucknow |
| Family: Rhynchobdellidae (Bleeker) | | | |
| Macrognathus (Rhynchobdella) aculeata (Bloch) | Allocreadium mehrai | Gupta, 1956 | Lucknow |
| | Rhynchocreadium aculeatum | Srivastava, 1962 | *India |
| | Rhynchocreadium singhi | Pershad, 1965 | Hyderabad |
| | Allocreadium mehrai | Kakaji, 1969 | Lucknow |
| Mastacembelus armatus (Lac.) | Isoparorchis hypselobagri | Bhalerao, 1936 | Hyderabad |
| | *Phyllodistomum sp. | Bhalerao, 1937 | Poona |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Opegaster mastacembeli | Srivastava, 1937 | Jabalpur |
| | Opegaster mehrai | Harshey, 1937 | Allahabad |
| | Phyllodistomum singhiai | Gupta, 1951 | Lucknow & Saharanpur |
| | Genarchopsis (Ophiocorchis) farucuis | Gupta, 1951 | Lucknow & Saharanpur |
| | Clinostomum mastacembeli | Jaiswal, 1957 | Hyderabad |
| | Allocreadium spindale | Saxena, 1958 | Raipur |
| | Eurostomum armati | Tewari, 1959 | *India |
| | Prosotocus mastacembeli | Agarwal, 1964 | Lucknow |
| | Stomachicola mastacembeli | Verma, 1973 | Lucknow |
| | Orientodiscus mastacembeli | Agarwal & Agrawal, 1979 | Jhansi |
| | Helostomatis bundelkhandensis | Agarwal & Agrawal, 1980 | Jhansi |
| | Orientodiscus orchhaensis | Agarwal & Agrawal, 1980 | Jhansi |
| | Gangatrema ritai | Agarwal & Agrawal, 1980 | Jhansi |
| | Gangatrema chauhani | Agarwal & Kumar, 1981 | Varanasi |
| | Phyllodistomum cephaloglandulata | Pandey & Dwivedi, 1983 | Faizabad |
| | Eucreadium pandeyi | Srivastava, Saxena & Kumar, 1983 | Doon Valley |
| | Dactylostomum jhansiensis | Agarwal & Agrawal, 1988 | Jhansi |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Dactylostomum harishaii | Agrawal & Agarwal, 1988 | Jhansi |
| | Opedunculata kashiensis | Maurya & Agarwal, 1989 | Varanasi |
| Mastacembelus pancalus (Cuv.& Val.) | Mimodistomum angustioauda (Syn. Azygia angusticauda) | Stafford, 1913 | Hyderabad |
| Order: Physostomi | | | |
| Family: Clupeidae | | | |
| Hilsa (Clupea) ilisha (Ham.) | Lecithaster indicus | Srivastava, 1935 | Allahabad |
| | Lecithaster extralobatus | Srivastava, 1935 | Allahabad |
| | Faustula brevichrus | Srivastava, 1935 | Allahabad |
| | Faustula (Orientophorus) gangeticus | Srivastava, 1935 | Allahabad |
| | Faustula (Orientophorus) ilishii | Srivastava, 1935 | Allahabad |
| | Faustula (Orientophorus) clupii | Srivastava, 1935 | Allahabad |
| | Lecithocladium (Clupenurus) piscicola | Srivastava, 1935 | Allahabad |
| | Faustula chauhani | Gupta & Srivastava, 1960 | Allahabad |
| | Faustula varanasiensis | Agarwal & Kumar, 1977 | Varanasi |
| | Fastula makundi | Agarwal & Verma, 1981 | Varanasi |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Faustula indica | Agarwal & Verma, 1981 | Varanasi |
| | Faustula varensis | Kumar & Agarwal, 1984 | Varanasi |
| | Faustula pyriformes | Kumar & Agarwal, 1984 | Varanasi |
| Family: Cyprinidae | | | |
| Barilius barana (Gunther) | Helostomatis indica | Verma, 1973 | Lucknow |
| | Allocreadium barnai | Gupta & Verma, 1976 | Lucknow |
| Barilius gatensis (Gunther) | Pycnadena bariliusi | Vasantha Kumari & Srivastava, 1975 | Calcutta |
| Catla catla (Ham.) | Allocreadium catlai | Kakaji, 1969 | Lucknow |
| Cirrhina fulungel (Skyes) | Capalleroia indica | Thapar, 1960 | Lucknow |
| Cirrhina mrigala (Ham.& Val.) | Allocreadium mrigalai | Gupta & Verma, 1976 | Lucknow |
| Labeo calbasu (Ham.) | Helostomatis sakrei | Bhalerao, 1937 | Poona |
| Labeo dero (Ham.) | Astiotrema fotedari | Dhar, 1978 | Kashmir |
| Labeo fimbriata (Gunther) | *Phyllodistomum sp. | Jaiswal, 1957 | Hyderabad |
| Labeo rohita (Ham.) | Allocreadium indicum | Kalyankar & Deshmukh, 1980 | Aurangabad |
| Leuciscus indus (Cuv.& Val.) | Cotylogunoporum orfeum | Thapar & Dayal, 1932 | Lucknow |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| Oreinus sinuatus (Gunther) | Clinostomum schizothoraxi | Kaw, 1950 | Jhelum river & Manasbal Lake, Kashmir |
| | Neascus vetastai | Kaw, 1950 | Jhelum river & Manasbal Lake, Kashmir |
| Oxygaster (Chela) bacila (Ham.& Gunther) | Allocreadium kamlai | Gupta, 1956 | Lucknow |
| | Chelatrema smythi | Gupta & Kumari, 1970 | Ropar, Nangal, Ludhiana |
| | Hamacreadium manteri | Gupta & Kumari, 1970 | Ropar, Nangal, Ludhiana |
| | Eucreadium guptai | Verma, 1973 | Lucknow |
| | Eucreadium thapari | Agarwal & Kumar, 1979 | Gorakhpur |
| | Neoeucreadium mahobaensis | Agarwal & Agrawal, 1981 | Mahoba District Hamirpur |
| Oxygaster (Chela) gora (Ham.& Gunther) | Pycnadena komiai | Srivastava, 1962 | *India |
| | Eucreadium cameroni | Gupta, 1963 | Varanasi |
| | Hamacreadium manteri | Gupta & Kumari, 1970 | Nangal, Ropar, Ludhiana |
| | Eucreadium varanasai | Agarwal & Verma, 1972 | Varanasi |
| Puntius (Barbus) chilinoides (Cuv.& Val.) | Asymphylodora kedrai | Srivastava, 1951 | Hardoi |
| Puntius (Barbus) debsoni (Day) | Cleptodiscus poonensis | Bhalerao, 1937 | Poona |
| Puntius (Barbus) sarana (Ham.& Buch.) | Gorgotrema barbius | Dayal, 1938 | Lucknow |
| | Allocreadium makundi | Gupta, 1963 | Varanasi |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Neopodocotyle lucknowensis | Gupta & Chakravarty, 1966 | Lucknow |
| | Neopodocotyle dayali | Pandey, 1973 | *India |
| | Neopodocotyle mehrai | Rai, 1971 | Gorakhpur |
| | Asymphylodora tincae | Rai, 1971 | Gorakhpur |
| | Allocreadium sarani | Gupta & Verma, 1976 | Lucknow |
| | Bundelatrema orchhaensis | Agarwal & Agrawal, 1982 | Orchha District Tekamgarh |
| | Neopodocotyle chauhani | Agrawal & Agarwal, 1983 | Jhansi |
| Puntius (Barbus) Shaguniо (Mc Clell.) | Eucreadium jhingarani | Srivastava & Singh, 1967 | Sone, River, Bihar |
| Puntius (Barbus) sophore (Ham.& Day) | Asymphylodora kedari | Srivastava, 1951 | Hardoi |
| | Neupodocotyle mehrai | Rai, 1971 | Gorakhpur |
| | Asymphylodora tincae | Rai, 1973 | Gorakhpur |
| | Brahmputrotrema gwaliorensis | Dandotia & Bhadauria, 1979 | Gwalior |
| Puntius (Barbus) (Ham.& Buch.) | Tetracotyle lali | Pandey, 1970 | Lucknow |
| Puntius (Barbus) tor (Ham.& Buch.) | Isoparorchis trisimilitubis | Southwell, 1913 | Bankipur, Calcutta |
| | Allocreadium mahaseri | Pande, 1938 | Allahabad |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Allocreadium dolfusi | Rai, 1962 | Ratanagiri, Sibera |
| | Allocreadium singhi | Rai, 1962 | Ratanagiri, Sibera |
| | Allocreadium hirnai | Rai, 1962 | Ratanagiri, Sibera |
| Rosbora rasbora (Ham.& Buch.) | Paramicrolecithus rasbori | Srivastava & Ghosh, 1967 | Assam |
| Schizothorax esocinus (Mc Cletland) | Phyllodistomum loossi | Kaw, 1950 | Kashmir |
| Schizothorax micropagon (Heckel) | Allocreadium schizothoracis | Pande, 1938 | Allahabad |
| Schizothorax niger (Heckel) | Crepidostomum indicum | Kaw, 1944 | Kashmir |
| | Clinostomum schizothoraxi | Kaw, 1944 | Kashmir |
| | Allocreadium kashmirensis | Fotedar & Dhar, 1974 | Kashmir |
| | Allocreadium fotedari | Dhar & Kharoo, 1984 | Kashmir |
| Sub-family: Cobitidina | | | |
| Nemachelius kashmirensis | Allocreadium nemachilus | Kaw, 1950 | Kashmir |
| Family: Muraenidae (Muller) | | | |
| Anguilla bengalensis (Grey & Hardev) | Opegaster anguilli | Harshey, 1933 | Allahabad |
| | Nicolla (Crowcrocaecum) allahabadensis | Srivastava, 1963 | Allahabad |
| | Nicolla (Crowcrocaecum) indicum | Srivastava, 1968 | Allahabad |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Opegaster jamunious | Srivastava, 1968 | Allahabad |
| Family: Notopteridae | | | |
| Notopterus chitala (Ham.) | Singhia thapari (Syn.Eclinostomum thapari) | Singh, 1953 | Lucknow |
| Notopterus notopterus (Ham.) | Isoparorchis hypselobagri | Bhalerao, 1936 | Hyderabad |
| | Clinostomum indicum | Bhalerao, 1941 | Hyderabad |
| Family: Scombresoccidae | | | |
| Xenentodon (Belone) belone (Ham.& Gunther) | Elliovitellosum indicum | Gupta & Sharma, 1972 | Ratanagiri |
| Xenentodon (Belone) cancilla (Ham.& Val.) | Bucephalopsis karvei | Bhalerao, 1937 | Poona |
| | *Phyllodistomum sp. | Bhalerao, 1937 | Poona |
| | Bucephalopsis karvei | Gupta, 1956 | Lucknow |
| | Roparhynchus nelsoni | Gupta & Sharma, 1972 | Ratanagiri |
| | Bucephalopsis chauhani | Chauhan, 1975 | *India |
| | Bucephalopsis gaurii | Chauhan, 1975 | *India |
| Family: Siluridae | | | |
| Bagarius bagarius (Ham.) | Phyllodistomum tripathi | Motwani & Srivastava, 1961 | *India |
| | Bucephalus allahabadensis | Srivastava, 1962 | Allahabad |

| Host | Parasites | Author's Record | Localities |
|---|---|---|---|
| | Bucephalus indica | Agarwal & Agarwal, 1979 | Raipur |
| | Opisthorchis gwaliorensis | Bhaduria & Dandotia, 1979 | Gwalior |
| | Opisthorchis thapari | Agarwal & Singh, 1980 | Lucknow |
| | Bucephalus purshottami | Agarwal & Kumar, 1985 | Varanasi |
| | Bucephalus bharatica | Agarwal & Kumar, 1985 | Varanasi |
| Bagarius bagarius (Bagarius yarrelli) (Ham.& Skyes) | Opisthorchis pedicellata | Verma, 1927 | Allahabad |
| | Gomtia piscicola | Thapar, 1930 | Lucknow |
| | Opisthorchis pedicellata | Mehra, 1941 | Allahabad |
| | Neobucephalopsis bagarius | Dayal, 1949 | Lucknow |
| Callichrous bimaculatus (Bleeker) | Neopodocotyle indica | Dayal, 1944 | Lucknow |
| Callichrous pabda (Ham.& Buch.) | Pleurogene pabdai | Pande, 1937 | Allahabad |
| | Plesiodistomum callichrous | Dayal, 1942 | Lucknow |
| Clarias batrachus (Linn.) | Astiotrema spinosa | Chatterji, 1933 | Rangoon |
| | Masenia collata | Chatterji, 1933 | Rangoon |
| | Orientocreadium clariae (Syn. Ganada Clariae) | Chatterji, 1933 | Rangoon |
| | Orientocreadium (Neoganada) barabankiae | Dayal, 1935 | Lucknow |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Astiotrema classia | Dayal, 1938 | Lucknow |
| | Orientocreadium (Ganadotrema) mahendrai | Gupta, 1951 | Saharanpur |
| | Orientocreadium (Ganadotrema) vermai | Gupta, 1951 | Saharanpur |
| | Neopecoelina saharanpurensis | Gupta, 1953 | Saharanpur |
| | Gauhatiana batrachii | Gupta, 1955 | Gauhati, Assam |
| | Masenia dayali | Gupta, 1955 | Saharanpur |
| | Orientocreadium (Neoganada) barabankiae | Jaiswal, 1957 | Hyderabad |
| | Orientocreadium raipurensis | Saxena, 1958 | Raipur |
| | Orientocreadium dayali | Saxena, 1958 | Raipur |
| | Orientocreadium umadasi | Saxena, 1958 | Raipur |
| Clupisoma (Pscudotropius) taakree (Day) | Haplorchoides taakree (Syn. Monorchitrema taakree) | Dayal, 1935 | Lucknow |
| | Bucephalopsis thapri | Dayal, 1948 | Lucknow |
| Eutropiichthys vacha (Ham.) | Haplorchoides (Haplorchis) piscicola | Srivastava, 1935 | Allahabad |
| | Bucephalopsis fusiformis | Verma, 1936 | Allahabad |
| | Bucephalus gangeticus | Srivastava, 1937 | Allahabad |

| Host | Parasites | Author's record | Locality |
|---|---|---|---|
| | Polyorchitrema piscicola | Srivastava, 1937 | Allahabad |
| | Eucreadium eutropiichthyius | Dayal, 1942 | Lucknow |
| | Bucephalopsis simhai | Dayal, 1948 | Lucknow |
| | Phyllodistomum vachius | Dayal, 1949 | Lucknow |
| | Eucreadium eucreadium | Dayal, 1950 | Lucknow |
| | Neobucephalopsis eutropiichthys | Gupta, 1955 | Lucknow |
| | Falliorchis vermai | Srivastava, 1963 | Allahabad & Bhagalpur |
| | Rhipidocotyle vachius | Singh & Sinha, 1976 | Dinapore |
| | Polyorchotrema inglisi | Gupta & Puri, 1980 | Lucknow |
| Gagata cenia (Ham.& Buch.) | Gomtia gagatia | Dayal, 1949 | Lucknow |
| *Glyptosternum sp. (Mc Cleland) | Phyllodistomum folium | Kakaji, 1969 | Muzaffarnagar |
| Heteropneustes (Saccobranchus) fossilis (Bleeker) | Orientocreadium indicum | Pande, 1934 | Allahabad |
| | Clinostomum dasi | Bhalerao, 1942 | Hyderabad |
| | Orientocreadium (Ganadotrema) indicum | Dayal, 1949 | Lucknow |
| | Cephalogonimum heteropneustus | Gupta, 1951 | Lucknow |
| | Eumasenia moradabadensis | Srivastava, 1951 | Moradabad |
| | Masenia fossilisi | Gupta, 1955 | Saharanpur |
| | Neopecoelina saharanpurensis | Gupta, 1955 | Saharanpur |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Oudhia horai | Gupta, 1955 | Manipur |
| | Phyllodistomum (Catroptoides) indicum | Jaiswal, 1957 | Hyderabad |
| | Emoleptalea loossi | Srivastava, 1960 | Raipur |
| | Emoleptalea dollfusi | Srivastava, 1960 | Raipur |
| | Allocreadium heteropneustusius | Agrawal, 1964 | Lucknow |
| | Phyllodistomum vachius | Pandey, 1972 | Lucknow |
| Mystus (Macrones) aoria (Skyes) | Bucephalus aoria | Verma, 1936 | Allahabad |
| | Bucephalus tridentacularia | Verma, 1936 | Allahabad |
| Mystus cavasius (Ham.& Buch.) | Orientocreadium (Macrotrema) macroni | Gupta, 1951 | Saharanpur |
| | Neopecolina cavasius | Gupta, 1955 | Lucknow |
| Mystus (Macrones) oar (Skyes) | Bucephalus gangai | Maurya & Agarwal, 1988 | Varanasi |
| | Bucephalus dasashwamedhai | Maurya & Agarwal, 1988 | Varanasi |
| Mystus (Macrones) seenghala (Skyes) | Haplorchoides (Haplorchis) attenuatum | Srivastava, 1935 | Allahabad |
| | Bucephalus tridentacularia | Verma, 1936 | Allahabad |
| | Bucephalus indicus | Srivastava, 1938 | Allahabad |
| | Bucephalus gangeticus | Srivastava, 1938 | Allahabad |
| | Opisthorchis pedicellata | Mehra, 1941 | Allahabad |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Bucephalopsis thapari | Dayal, 1948 | Lucknow |
| | Haplorchoides macroneus | Dayal, 1949 | Lucknow |
| | Haplorchoides seenghali | Gupta, 1955 | Gauhati, Assam |
| | Haplorchoides macronis | Agarwal, 1964 | Lucknow |
| | Pseudoparamacro-deroides seenghali | Gupta & Agarwal, 1968 | Lucknow |
| | Genarchopsis cameroni | Kakaji, 1969 | Lucknow |
| | Cephalogonimus seenghalus | Kakaji, 1969 | Lucknow |
| | Orientocreadium (Macrotrema) seenghalus | Kakaji, 1969 | Lucknow |
| | Godavaritrema indica | Karyakarte & Yadav, 1976 | Ratanagiri |
| Mystus striatus (Bloch) | Stoylotrema multivitellaria | Singh & Prashad, 1979 | Patna |
| Mystus (Macrones) tengara (Cuv.& Val.) | Phyllorchis macronius | Dayal, 1938 | Lucknow & Hyderabad |
| | Haplorchoides attenuatum | Jaiswal, 1957 | Hyderabad |
| Mystus (Macrones) vittatus (Cuv.& Bloch) | Phyllodistomum vittatusi | Gupta, 1955 | Assam |
| | Masenia vittatusi | Agrawal, 1963 | Lucknow |
| | Masenia gomtia | Agrawal, 1963 | Lucknow |
| | Pseudoparamacro-deroids vittatusi | Kakaji, 1969 | Lucknow |
| | Opisthorchis gorakhpurensis | Rai, 1971 | Gorakhpur |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Asymphylodora tincae | Rai, 1971 | Gorakhpur |
| | Haplorchoides mehrai | Pandey & Shukla, 1976 | Lucknow |
| | Oudhia hardayali | Agrawal & Kumar, 1980 | Varanasi |
| | Pseudoparamacro-deroide raychaudhurii | Agrawal & Kumar, 1983 | Varanasi |
| | Cephalogonimus hanumanthai | Agrawal and Agarwal, 1984 | Jhansi |
| | Pseudoparamacro-deroid keni | Agrawal & Agarwal, 1985 | District Hamirpur |
| | Haplorcoides piscicola | Gupta & Govinda, 1985 | Kanpur |
| | Pseudoparamacro-deroides varanasiensis | Maurya & Agarwal, 1989 | Varanasi |
| Pangasius buchanani (Cuv.& Val.) | Bucephalopsis garuai | Verma, 1936 | Allahabad |
| | Bucephalopsis magnum | Verma, 1938 | Allahabad |
| | Neobucephalopsis pseudotropei | Gupta, 1955 | Lucknow |
| | Neobucephalopsis gauhatiensis | Gupta, 1959 | Lucknow |
| | Phyllodistomum tripathi | Agarwal, 1966 | Lucknow |
| Pangasius pangasius (Ham.& Buch.) | Bucephalopsis garuai | Verma, 1936 | Allahabad |
| | Bucephalopsis confuscus | Verma, 1936 | Allahabad |
| | Protoladorchis burmanica (Syn. Maccallumia burmanica) | Chatterji, 1938 | Rangoon |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| Pseudotropius athernoides (Gunther) | Haplorchoides gangeticum (Syn.Haplorchis gangeticus) | Srivastava, 1935 | Allahabad |
| Rita buchanani (Bleeker) | Orientocreadium indicum | Pande, 1934 | Allahabad |
| Rita rita (Ham.) | Opisthorchis pedicellata | Verma, 1927 | Allahabad |
| | Allocreadium thapari | Gupta, 1950 | Hardoi |
| | Haplorchoides ritai | Gupta, 1955 | Assam |
| | Haplorchoides brahmputraensis | Gupta, 1955 | Assam |
| | Thaparotrema vittalani | Gupta, 1955 | Assam |
| | Assamia gauhatiensis | Gupta, 1955 | Assam |
| | Eumasenia ritai | Agarwal, 1964 | Lucknow |
| | Asymphyllodora ritai | Gupta & Agarwal, 1966 | Lucknow |
| | Allocreadium guptai | Kakaji, 1969 | Varanasi |
| | Masenia ritai | Sircar & Sinha, 1969 | Patna |
| | Neopodocotyle spinipora | Sircar & Sinha, 1969 | Patna |
| | Opisthorchis pedicellata intermedia | Gupta & Kumari, 1970 | Ropar, Nangal |
| | Masenia yamaguti | Agarwal & Agrawal, 1980 | Jhansi |
| | Gangatrema ritai | Agarwal & Agrawal, 1980 | Jhansi |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| | Oudhia hanumanthai | Tewari, 1983 | Meerut |
| | Oudhia kanungoi | Agarwal & Agrawal, 1984 | Hamirpur |
| | Haplorchoides kherai | Gupta & Govinda, 1985 | Kanpur |
| | Opisthorchis dayali | Agarwal & Kumar, 1987 | Varanasi |
| | Nicolla fotedari | Agrawal & Sharma, 1988 | Jhansi |
| | Nicolla ritai | Agrawal & Sharma, 1989 | Jhansi |
| Wallago (Wallagonia) attu(Bloch) | Isoparorchis hypselobagri (Syn.Isoparorchis trisimilitubius) | Southwell, 1913 | Calcutta |
| | Haplorchoides parini | Chatterji, 1936 | Allahabad |
| | Opisthorchis pedicellata | Mehra, 1941 | Allahabad |
| | Ganeo gobindia | Dayal & Gupta, 1955 | Lucknow |
| | Allogomtiotrema (Gomtiotrema) attu | Gupta, 1955 | Lucknow |
| | Pleurogene attui | Kakaji, 1968 | Lucknow |
| | Bucephalus octotentacularis | Kakaji, 1969 | Lucknow |
| | Opisthorchis caudalspinutum | Bhaduria & Dandotia, 1979 | Gwalior |
| | Haplorchoides srivastavai | Gupta & 1985 | Kanpur |

| Host | Parasites | Author's Record | Locality |
|---|---|---|---|
| Family: Symbranchidae | | | |
| Amphipnous cuchia (Ham.) | Phyllodistomum spatuliformae | Kakaji, 1969 | Muzaffarnagar |
| | Genarchopsis cuchia | Kakaji, 1969 | Muzaffarnagar |
| | Neopodocotyle gorakhpurensis | Agarwal & Kumar, 1986 | Varanasi |

*Originals not seen.